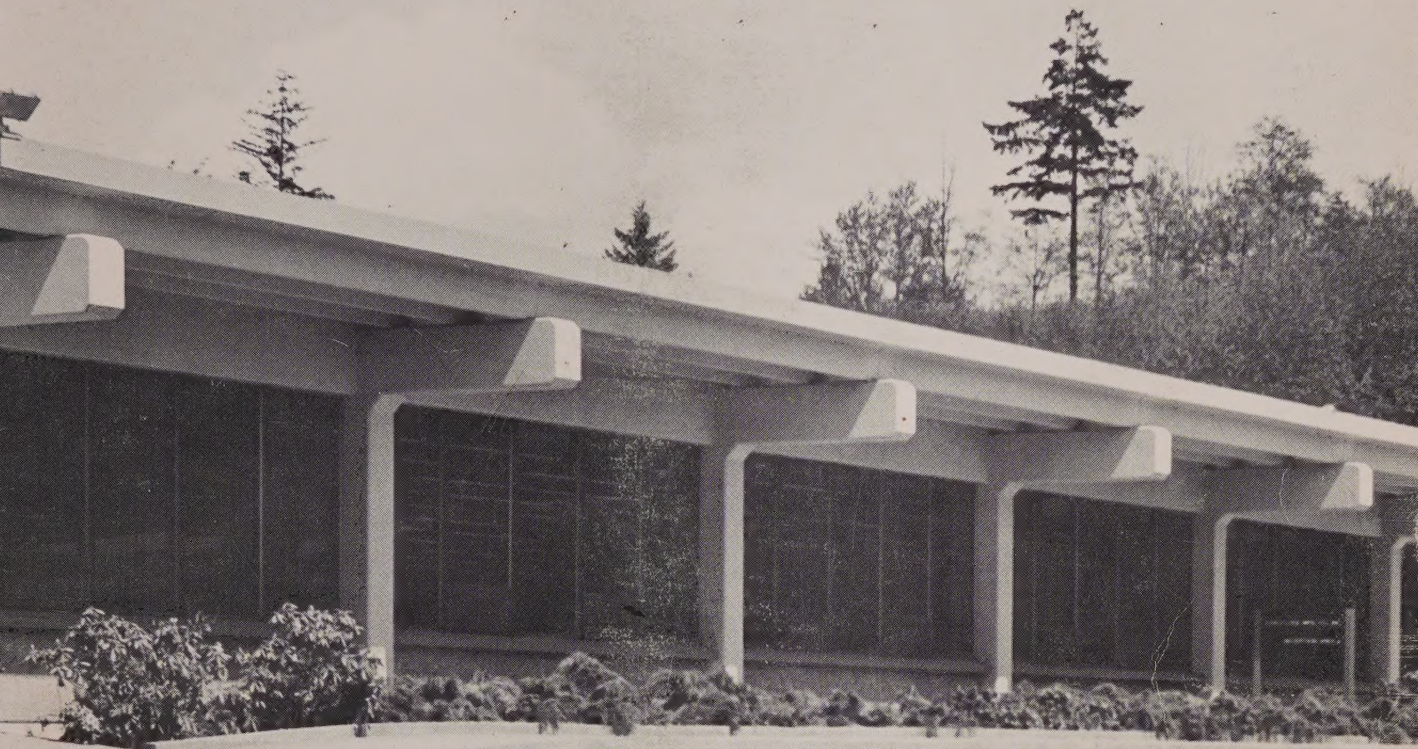


Instruction Manual



Preliminary



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MODEL

6011A

SYNTHESIZED SIGNAL GENERATOR

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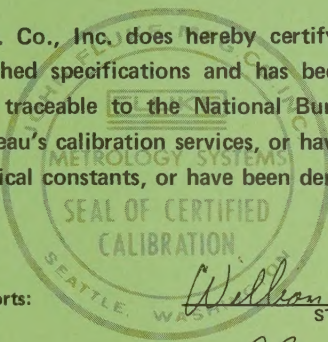
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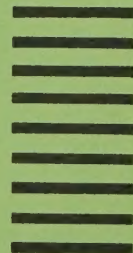
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Have you had previous experience with Fluke instruments? ☐ Yes ☐ No

Did you buy this Fluke product to: ☐ Replace existing equipment ☐ Expand your instrumentation capability

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Did you examine comparable products manufactured by other companies before deciding on Fluke? ☐ Yes ☐ No

When you received your instrument, was it in good physical condition? ☐ Yes ☐ No

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Have you owned or used Fluke products prior to this purchase? ☐ Yes ☐ No If yes, how do you rate Fluke products?

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Section 1

Introduction & Specifications

1-1. INTRODUCTION

1-2. The Model 6011A Synthesized Signal Generator provides keyboard control of output frequency, from 10 Hz to 10.99999 (11) MHz, and output amplitude, from 0.4V rms to 5.0V rms. The frequency band is covered in two overlapping ranges. The low range, spanning 10 Hz to 109.9999 (110) kHz, provides frequency resolution of 0.1 Hz while the high range provides 10 Hz resolution for output frequencies from 10 Hz to 11 MHz. The range is automatically selected to provide maximum resolution for the selected output frequency. The instrument can be manually placed in either high or low range using the range override control.

1-3. The signal output level can be selected in volts, millivolts, or decibels. The volts or millivolts output can be expressed in either Vp-p or V rms. Output signal level as well as frequency are displayed on the front panel. An edit control allows any displayed digit, either in frequency or amplitude, to be selected (indicated by the brightened digit) and changed.

1-4. Keyboard information for up to nine separate signal generator outputs can be stored, then recalled to provide the preselected output. The generator output is controlled by information stored at each of the nine locations.

In the memory recall mode of operation, the generator output can be changed by pressing any of the digit keys (1-9) that have been programmed to provide a desired output.

1-5. A reference frequency and reference level can be selected around which the output of the generator can be changed. A change sign key (+/-) determines whether the next frequency or level command will be added to or subtracted from the references. The actual value of frequency and level at the generator output, i.e., the reference frequency and level plus the deviations, can be displayed on the front panel by pressing the "actual" key.

1-6. Modulation of the generator output signal, in either amplitude or frequency (optional), can be selected by keys on the front panel. Rear panel input jacks provide for external dc voltage control of up to 95% amplitude modulation and ± 20 kHz frequency modulation.

1-7. Optional features are available to tailor the signal generator to specific applications. These options are described in Table 1-1.

1-8. SPECIFICATIONS

1-9. The pertinent specifications for the Model 6011A are listed in Table 1-2.

Table 1-1. OPTIONS

OPTION	DESCRIPTION	OPTION	DESCRIPTION
-01	High Performance TCXO; aging rate, less than 1 part in 10^8 per 24 hours.	-05	IEEE P488 General Purpose Bus Interface; (Byte serial, bit parallel) Compatible with proposed IEC TC 66, WG3 interface.
-02	Phase Lockable Input; 1,2,2.5, 5 or 10 MHz input provides 10 MHz output of 100 mV to 5V rms into 50 ohms.	-06	EIA Standard RS-232C Interface; (Byte serial, bit serial) with 20 mA current loop.
-03	Frequency Modulation; external input control of deviation about a dialed frequency, ± 20 kHz in high range ± 200 Hz in low range.	-07	50 to 400 Hz Line Power.
-04	Rear Panel Output	-08	100V, 50 to 60 Hz Line Power.
		-09	20-31 MHz Tracking Output; (TTL level)

Table 1-2. SPECIFICATIONS

FREQUENCY	
Ranges	10 Hz to 10.99999 MHz in the high range. 10 Hz to 109.9999 kHz in the low range.
Resolution	10 Hz in the high range 0.1 Hz in the low range
Range Selection	Automatic with manual override
Accuracy	± 3 parts in 10^{-6} per year over temperature range of 0° to 50°C
Aging Rate	Less than 1 part in 10^{-8} per day at constant temperature or 1 part in 10^{-6} per year.
Temperature Dependence	Less than ± 2 parts in 10^{-6} from 0° to 50°C
Local Control	Keyboard selection of numeric data, units indicator (Hz, kHz, MHz) modulation (AM or optional FM), and Frequency Edit
Remote Control	Byte serial, bit parallel - Two programming formats Fixed Form and Free Form
Display	Seven digit LED display
Storage	Facility to store and recall 10 front panel settings including frequency, attenuator, and modulation settings.

Table 1-2. SPECIFICATIONS (Cont.)

SPECTRAL PURITY

Harmonics	—50dB from 10 Hz to 1MHz —40dB from 1MHz to 11 MHz (Except, —35dB for output levels within 2dB of max output on each attenuation range from 1MHz to 11 MHz.) Total harmonic distortion less than 0.3% from 10 Hz - 110 kHz. (Typical harmonically related outputs will be greater than 60dB down.)
Spurious	All nonharmonically related outputs will be greater than 60dB below the specified output or —110dBm whichever is greater.
Signal to Phase Noise Ratio	Greater than 46dB as measured in a 30 kHz band excluding 1Hz centered on the carrier, including the effects of the internal standard. Residual (excluding internal standard) is greater than 50dB down. Improvement on Low Range.
Phase Noise Spectral Density	35B S/N ratio at the output measured in a 1Hz bandwidth at maximum output (typical). Improvement on Low Range.

OFFSET FREQUENCY	55B S/N
20 Hz	102dB
200 Hz	108dB
20 kHz	106dB
1 MHz	130dB

OUTPUT AMPLITUDE

Amplitude (Maximum):.	5.000V rms terminated 10.000V rms open circuit 14.14V p-p terminated 28.28V p-p open circuit +26.98 dBm
Amplitude Range:	
dB:	+26.98 dBm to —55.01 dBm
Volts:	5.000V to 0.3972 mV into 50Ω
Amplitude Resolution:	
dB:	0.01 dB
Volts:	1V to 5.000V 1 mV 100 mV to 999.9 mV 0.1 mV 10 mV to 99.99 mV 10 uV 1 mV to 9.999 mV 1 uV 0.3972 mV to 0.9999 mV 0.1 uV
Output Impedance:	50Ω

Table 1-2. SPECIFICATIONS (Cont.)

Display:

dB: 4 digit plus sign in dBm or dB with respect to stored dBm reference.

Volts: 4 digit in V p-p or V rms; Open Circuit or Terminated or volts or dB around a stored voltage reference.

Frequency Response: ± 0.025 dB 100 Hz to 5 MHz
 ± 0.05 dB 20 Hz to 11 MHz
 -0.025 dB to $+0.1$ dB 10 Hz to 20 Hz

Amplitude Accuracy 10 kHz, 20°C to 30°C
 (Absolute): ± 0.05 dB at +26.98 dBm to $+0.1$ dB at +14.99 dBm

Attenuator Accuracy: ± 0.025 dB/10 dB step

AUXILIARY OUTPUTS

Square Wave Available at the TTL OUT connector on the rear panel. Frequency is identical to main output; amplitude 0.5 to 2.5V peak-to-peak, into 50 ohms.

Reference Available at the REF OUT connector on the rear panel. Signal derived from internal reference oscillator 1, 5, or 10 MHz output; selected by internal jumpers. Output is TTL compatible square wave 0 to 3.5V peak.

INPUTS

External Reference Requires a 10 MHz TTL compatible square wave with symmetry between 40% and 60%. Internal reference automatically selected in absence of an external reference.

GENERAL

Operating Environment 0 - 50°C, 0 to 80% RH, 0 to 10,000 feet

Non-Operating -40 to +75° C

Line Power 115/230V rms $\pm 10\%$, 50 - 60 Hz
 100V rms $\pm 10\%$, 50 - 60 Hz (optional)
 115/230V rms $\pm 10\%$, 400 Hz (optional)

Size 5¼" H X 8½" W X 19" D (13.34 cm X 21.59 cm X 48.26 cm)

Weight 25 lbs (11.4 kg)

Section 2

Operating Instructions

2-1. INTRODUCTION

2-2. This section contains information essential for correct operations of the Model 6011A. Should any difficulties be encountered during operation, please contact the nearest John Fluke Sales Representative or the John Fluke Mfg. Co., Inc. A list of Sales Representatives is located at the rear of this manual.

2-3. SHIPPING INFORMATION

2-4. The 6011A was packaged and shipped in a foam packed cardboard carton. Upon receipt, a thorough inspection of the instrument should be performed to reveal any damage that may have occurred in transit. If reshipment is necessary, the original container should be used. If it is not available, a new container can be obtained from the John Fluke Mfg. Co., Inc. Please reference the instrument model number when ordering a new container.

2-5. INPUT POWER

2-6. The 6011A can be operated from either 115 or 230V ac, 50 to 60 Hz line power. A slide switch located in the bottom of the main pcb (remove the bottom dust cover for access) can be positioned to allow operation from the appropriate line voltage. The line power fuse (F1) is located in a fuse holder on the rear panel. Correct fuse size for 115 volt and 230Volt operation is provided next to the fuse-holder.

2-7. OPERATING FEATURES

2-8. The location of all controls, connectors, and indicators is shown in Figure 2-1. The function of the groups of controls identified in Figure 2-1 is explained in Table 2-1. More detailed operating information is provided in this section under General operating Information.

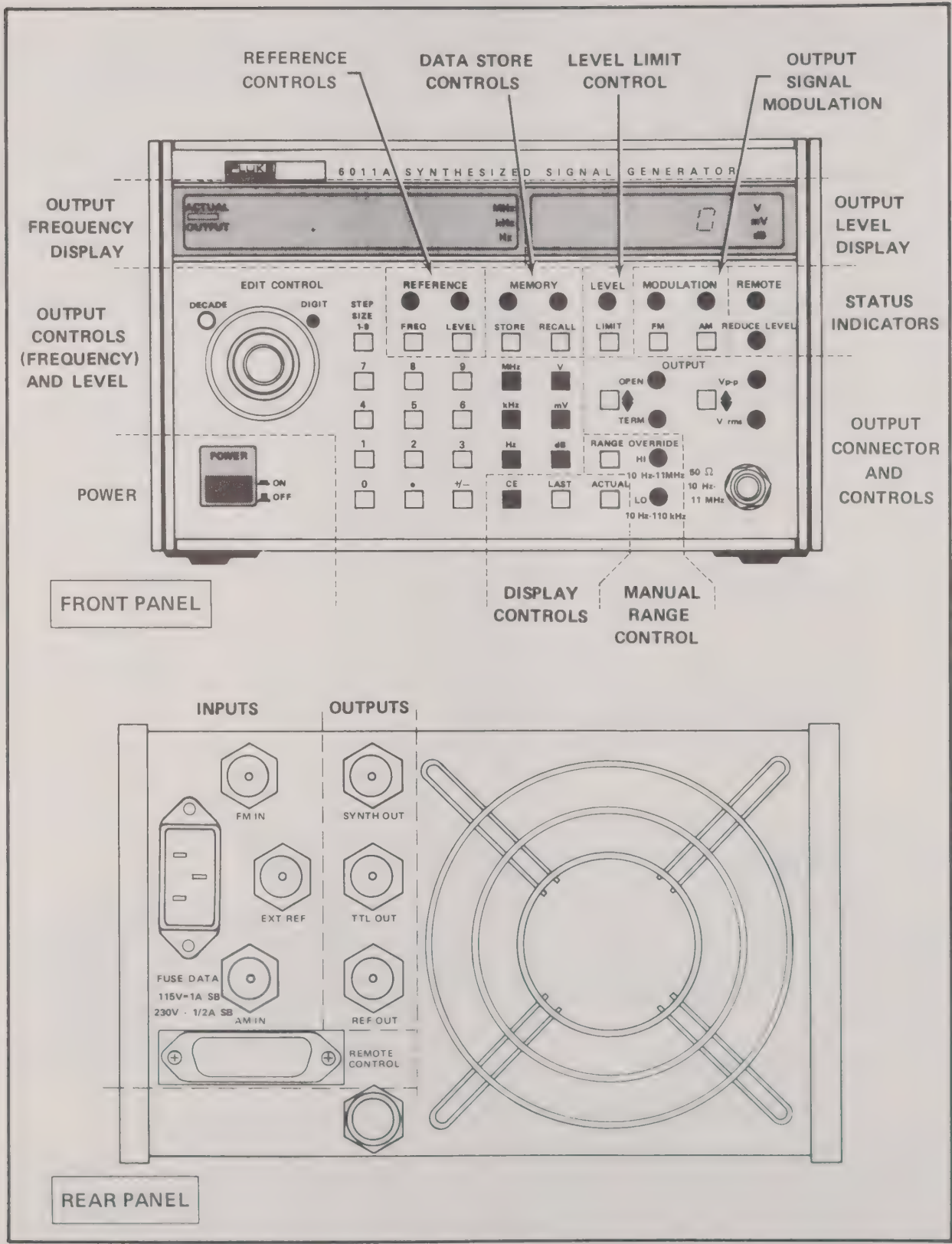


Figure 2-1. 6011A CONTROLS AND CONNECTORS

Table 2-1. OPERATING CONTROLS FUNCTIONAL DESCRIPTION

FRONT PANEL	
Output Controls (Frequency and Level)	Keyboard entry for digit decimal point, and unit (MHZ, kHz, or Hz for output frequency and for digit, decimal point, and unit (V, mV, or dB) for output level. EDIT CONTROL: Selects a decade (outer dial) in either frequency or level display which is then changed by the DIGIT (inner dial) control.
Output Frequency Display	Each digit of a new entry, either frequency or level, will appear in this display as it is selected. If the entry is for an output level, the display will shift to the Output Level display when a level unit's key is pressed. If the entry is frequency, then the Output Frequency display will indicate the selected frequency.
Output Level Display	The selected output level will be displayed when the output level unit (V, mV, or dB) is selected.
Status Indicators	REMOTE: The remote indicator lights when the 6011A is being remotely controlled. REDUCE LEVEL: The reduce level indicator lights when a selected set of output conditions requires the 6011A to try to output more than 5V rms.
Output Connector and Controls:	The bnc connector provides front panel output of the selected frequency and level. OPEN-TERM Control: Selects a display to indicate the voltage that will be developed across a 50 ohm load in TERM mode (5V rms max.), or a display to indicate the voltage that will be developed across an open circuit ($> 50\text{ k}\Omega$) in OPEN mode. (10 V rms max.). Vp-p - Vrms: Allows for selection of output level display in either peak-to-peak voltage or rms voltage.
Manual Range Control:	RANGE OVERRIDE: Causes a low range (.1 Hz resolution) output frequency to change to a high range (10 Hz resolution). The control will cause a high range output frequency to change to low range if the output frequency is below 110 kHz.
Display Controls:	CE: Clear Entry key will cause the output frequency display to show only a zero in the most significant digit. LAST: This key will cause the display to indicate the last valid entry (frequency and level). ACTUAL: Pressing this key causes the displays (frequency and level) to indicate the actual output level and frequency. The inactive decimals of the display will flash on and off.
Power:	POWER: Switch applies operating power to the 6011A circuitry.

Table 2-1. OPERATING CONTROLS FUNCTIONAL DESCRIPTION (Cont.)

FRONT PANEL

Reference Controls:

FREQ: This key is used in conjunction with the Memory STORE key to set a reference frequency.

LEVEL: This key in conjunction with the memory STORE key set a reference level.

Data Store Controls:

STORE: The Memory STORE key selects the last valid output level and frequency entry for storage. A storage location (digit keys 1-9, reference FREQ and/or LEVEL, or LEVEL LIMIT) must be selected after pressing the STORE key.

RECALL: The Memory RECALL key will recall the data from any storage location.

NOTE

The recalled display may not indicate the actual output of the 6011A, i.e., if a reference frequency or reference level is entered and a digit (1-9) storage location is recalled, the display will indicate the data in the storage location but the 6011A output will be a combination of the reference plus the digit location data.

Level Limit Control:

LIMIT: A level limit, less than the 5V rms maximum output, can be selected to prevent inadvertent selection of potentially damaging output levels. Set the desired level, press the STORE key, then the Level LIMIT key.

Output Signal Modulation:

AM: Amplitude Modulation of the output signal is selected by pressing the Modulation AM key. The amount of modulation is controlled by an analog voltage applied to the AM IN rear panel connector.

REAR PANEL

Inputs:

FM IN (Optional): Provides connection for the signal used to control frequency modulation of the 6011A output signal.

EXT REF: Provides connection for a 10 MHz TTL compatible square wave input to be used as the 6011A reference signal.

AM IN: Provides connection for the signal used to control amplitude modulation of the 6011A output signal.

REMOTE CONTROL: A 24 pin connector for ASCII format remote control inputs. All control data selectable by the front panel keyboard can be remotely programmed.

Outputs :

SYNTH OUT (Optional): Replaces the front panel OUTPUT connector to allow rear panel connection for 6011A outputs.

TTL OUT: Provides a TTL compatible output signal equal in frequency to the generator output signal.

REF OUT: Provides a 1, 5, or 10 MHz (selected by internal jumpers) TTL compatible output, derived from the reference oscillator.

2-9. GENERAL OPERATING INFORMATION

2-10. The following information is designed to acquaint the operator with the proper sequence of control manipulation required to obtain specified signal generator outputs. It is recommended that the operator perform the following procedures in order to familiarize himself with the functional capabilities of the 6011A signal generator. The signal generator output can be connected, with a 50 ohm load, to an oscilloscope so that the output signal can be observed.

2-11. Power On

2-12. The 6011A is designed to provide maximum attenuation and zero output frequency when the front panel POWER button is pressed to the ON position. Observe the front panel for the following indications when the power is first applied to the unit.

- a. The most significant frequency digit (left) should be zero; all others blank.
- b. The OUTPUT, TERM (terminated) and V_{rms} indicators are on.

2-13. Output Frequency Selection

2-14. The following procedure provides examples illustrating the front panel keyboard entry for selection of output frequencies. Digit keys 0 through 9 plus the decimal point key are used to sequentially enter the desired output frequency; starting with the most significant digit. When the frequency unit key (Hz, kHz, or MHz) is pressed, the selected output will be displayed in the left portion of the front panel. If the selected frequency is 109.9999 kHz or less the LO range indicator will light. If the frequency is between 110 kHz and 10.99999 MHz the HI range indicator will light.

NOTE

The oscilloscope, if connected, will not display the frequency until an output level is selected (see next paragraph).

Example 1: Desired output frequency 9.8324 MHz.

- a. Press the digit key 9; note the most significant digit of the display is 9.
- b. Press the decimal key; the decimal should appear to the right of the 9.
- c. Press the remaining digit keys; i.e., 8, 3, 2 and 4 noting that the digits appear in the display.
- d. Press the MHz key. The display should show 9.83240 digits (the zero should be bright) and

the MHz indicator should be lit. The HI range LED should also be energized.

Example 2: Desired output frequency 12.384 kHz.

- a. Press the CE key (clear entry).
- b. Press each successive digit key, plus the decimal key, noting the display shows each digit as it is pressed.
- c. Press the kHz key. The display should show 12.3840 digits (the zero following the 4 should be bright) and the kHz indicator should be lit. The LO range LED should also be energized.

2-15. Output Level Selection

2-16. After selecting the output frequency, the desired output level should be entered. Digit keys 0 through 9 plus the decimal point key enter the numeric value followed by the output level units (V, mV, or dB). In the following examples note that the digits being entered appear at the left of the front panel display, then transfer to the right when the level unit key (V, mV, or dB) is pressed.

Example 1: Desired output level 2.186 volts.

- a. Press the digit key 2; note the displayed frequency is replaced by a two in the most significant digit.
- b. Press the decimal point key; the decimal point should appear to the right of the 2.
- c. Press the 1, 8, and 6 digit keys successively noting that each appears in the display.
- d. Press the volts (V) key; note the output level indications shifts to the right side of the display and the selected output frequency is displayed on the left.

Example 2: Desired output - 24.69 dB.

- a. Press the +/– key; a minus sign should appear at the left of the frequency display.
- b. Press the 2 digit key; note that a two appears.
- c. Press the 4, decimal, 6, and 9 keys.
- d. Press the dB level unit key; the output level indication should shift to the right display and the selected output frequency return to the left display.

2-17. Invalid Input Indication

2-18. Selected inputs, either frequency or level, which exceed the limitation of the generator will cause the digits of

the corresponding display to flash. The invalid input indication can be observed by selecting an output frequency of 11 MHz or selecting an output level of zero volts.

2-19. Edit Control

2-20. The edit control allows a valid output frequency or output level to be adjusted without re-entering a new input. When an output frequency is selected, the least significant digit of the displayed frequency will be brighter than the other digits. (The bright digit will shift to the least significant position of the level display when a level is entered.) The DECADE portion of the edit control changes the position of the bright digit. The DIGIT portion of the control will increment or decrement the value of the bright digit.

NOTE

The digit control will carry over to more significant decades but will not affect less significant decades.

2-21. Storing and Recalling Selected Outputs

2-22. The 6011A is capable of storing control data for up to nine different signal generator outputs. The stored data includes frequency, output level, output terminal conditions (terminated or open, V p-p or V rms), range override, and signal modulation. Once stored, the control data can be recalled to produce the pre-selected generator output. The generator operation for storage and recall is described in the following procedure.

- a. Select an output frequency and output level.
- b. Press the memory STORE key.
- c. Press any digit key (1 through 9) to select a storage location for the data.
- d. Select a new output frequency and output level.
- e. Press the memory STORE key then another digit key to select a storage location.
- f. Press the memory RECALL key then the digit key selected in step (c). The generator output should be equal to that selected in step (a).

2-23. Amplitude Modulation of the Output Signal

2-24. An analog input signal to the AM IN connector on the rear panel provides amplitude modulation control of the 6011A output when the modulation AM key is selected. The frequency of the control signal determines the rate of modulation while the control signal level regulates the percentage of modulation of the 6011A output signal. Control signal frequencies from dc to 10 kHz and levels from 0 to

4.75 volts can be used to control the amplitude modulation. The following procedure describes the amplitude modulation mode of instrument operation.

- a. Select an output frequency of 1 MHz and output level of three volts from the 6011A.
- b. Connect the 6011A output, via a 50 ohm in-line load, to an oscilloscope. Set the scope TIME/DIV control to .2 ms and VOLTS/DIV to 5V.
- c. Connect the output of a signal generator, set for 1 kHz at 2.5 volts peak, to the AM IN connector on the 6011A rear panel.
- d. Press the AM key on the 6011A front panel.
- e. The scope display should show the 1 MHz signal being amplitude modulated at a 1 kHz rate. The positive peak of the signal should be 6.36 volts and the trough should be 2.12 volts.

NOTE

The peak value of the modulated signal will be limited to about 7.07 volts peak; i.e., it is limited to a maximum 6011A output level of 5 volts rms. The following formula can be used to determine whether a particular AM input and selected output level will exceed the output limit.

$$\left(\frac{V_{AM\ IN}}{5} \times V_{OL} \right) + V_{OL} \leq 5V_{rms}$$

Where $V_{AM\ IN}$ is equal to the peak value of the input applied to the AM IN connector and V_{OL} is equal to the output level selected.

2-25. Setting a Reference Level and Frequency

2-26. A reference frequency and/or reference level can be entered into the 6011A around which the output signal can be varied. When a reference frequency, for instance is entered, frequencies subsequently selected will be added to or subtracted from the reference frequency. The following procedure will exercise the 6011A using reference frequencies:

- a. Select a 6011A output frequency of 500 kHz and output level of 2.5 volts.
- b. Press the memory STORE key then the reference FREQ key.
- c. Press the memory STORE key, then the reference LEVEL key.

NOTE

The display, frequency and level will display zero as each is stored as a reference.

- d. Select an output frequency of 10 kHz. The display should show 10 kHz only.
- e. Press the ACTUAL key. The display now indicates the actual output of the 6011A (510.00 kHz at 2.500V). The flashing decimal points in both frequency and level display are an indication that the display is of the actual output.
- f. Press the LAST key. The display will show the last valid selection made (10 kHz).
- g. Press the memory RECALL key, then the reference FREQ key. This display will show the value of the selected reference frequency with the decimal points in the frequency display flashing.
- h. Press the 3 digit key, then the dB key.
- i. Press the ACTUAL key. The display will show an output frequency of 510 kHz and an output level of 3.531 volts, (equal to the 2.5 volts reference plus 3 dB).
- j. Press the +/- key. The polarity indicator in the left display should be a minus sign.
- k. Press the 2 digit key, then the dB key.
- l. Press the ACTUAL key. The display should show 510 kHz output frequency at a 1.985 volts output level.
- m. Press the reference FREQ key, then the reference LEVEL key to exit the reference mode of operation.

2-27. Selecting an Output Level Limit

2-28. An output level limit can be selected above which the output level can not be programmed. The following procedure illustrates how a limit or output level is selected.

- a. Select an output frequency of 10 kHz and an output level of 2.0 volts.
- b. Press the memory STORE key, then the level LIMIT key. The 6011A is limited to a maximum output level of two volts.
- c. Select an output level of 2.5 volts. The display will show but the output will remain at the last selected level.
- d. Press the level LIMIT key to exit the level limit mode of operation.

2-29. Output Terminal Controls

2-30. Two keys provide selection of volts peak-to-peak or volts rms signal output and selection of either terminated (50 ohm) or open circuit output connector loading. Pressing the single key provided for each output operation toggles the output conditions between (OPEN) and (TERM) output terminal loading in one case and between (Vp-p) and (V-rms) output level in the other.

2-31. Remote Control Operation

2-32. The 6011A offers, with the standard unit, two remote byte serial programming formats, fixed form and free form. In the fixed form mode the decimal point location is determined by the range selected i.e., xx.xxxxx MHz in HI range and xxx.xxxx kHz in LO range. The data must be programmed by position. Each of the seven digits of display is selected by address code before the number is entered. The free form input allows the instrument to be remotely programmed essentially the same as that of the front panel keyboard entry. Each key, except the two output keys, on the 6011A front panel is represented in the remote control code by an ASCII character.

2-33. The characters used in both the fixed form and free form programs follow the ASCII code (American Standard Code for Information Interchange). The bit number and octal equivalent of the ASCII characters, used in both the fixed form and free form, are shown in Table 2-2. The bits are labeled ADB1 thru ADB7 to identify them as ASCII Data Bits.

Table 2-2. ASCII CODE

CHAR.	ABD NO.							OCTAL EQUIV.
	7	6	5	4	3	2	1	
A	1	0	0	0	0	0	1	101
B	1	0	0	0	0	1	0	102
C	1	0	0	0	0	1	1	103
D	1	0	0	0	1	0	0	104
E	1	0	0	0	1	0	1	105
F	1	0	0	0	1	1	0	106
G	1	0	0	0	1	1	1	107
H	1	0	0	1	0	0	0	110
I	1	0	0	1	0	0	1	111
J	1	0	0	1	0	1	0	112
K	1	0	0	1	0	1	1	113
L	1	0	0	1	1	0	0	114
M	1	0	0	1	1	0	1	115
N	1	0	0	1	1	1	0	116
O	1	0	0	1	1	1	1	117
P	1	0	1	0	0	0	0	120
Q	1	0	1	0	0	0	1	121
R	1	0	1	0	0	1	0	122
S	1	0	1	0	0	1	1	123

Table 2-2. ASCII CODE (Cont)

CHAR.	ADB NO.							OCTAL EQUIV.
	7	6	5	4	3	2	1	
T	1	0	1	0	1	0	0	124
U	1	0	1	0	1	0	1	125
V	1	0	1	0	1	1	0	126
W	1	0	1	0	1	1	1	127
X	1	0	1	1	0	0	0	130
Y	1	0	1	1	0	0	1	131
Z	1	0	1	1	0	1	0	132
0	0	1	1	0	0	0	0	060
1	0	1	1	0	0	0	1	061
2	0	1	1	0	0	1	0	062
3	0	1	1	0	0	1	1	063
4	0	1	1	0	1	0	0	064
5	0	1	1	0	1	0	1	065
6	0	1	1	0	1	1	0	066
7	0	1	1	0	1	1	1	067
8	0	1	1	1	0	0	0	070
9	0	1	1	1	0	0	1	071
SP	0	1	0	0	0	0	0	040
!	0	1	0	0	0	0	1	041
"	0	1	0	0	0	1	0	042
#	0	1	0	0	0	1	1	043
\$	0	1	0	0	1	0	0	044
%	0	1	0	0	1	0	1	045
&	0	1	0	0	1	1	0	046
'	0	1	0	0	1	1	1	047
(	0	1	0	1	0	0	0	050
)	0	1	0	1	0	0	1	051
*	0	1	0	1	0	1	0	052
+	0	1	0	1	0	1	1	053
,	0	1	0	1	1	0	0	054
-	0	1	0	1	1	0	1	055
.	0	1	0	1	1	1	0	056
/	0	1	0	1	1	1	1	057
:	0	1	1	1	0	1	0	072
;	0	1	1	1	0	1	1	073
<	0	1	1	1	1	0	0	074
=	0	1	1	1	1	0	1	075
>	0	1	1	1	1	1	0	076
?	0	1	1	1	1	1	1	077
NULL	0	0	0	0	0	0	0	000
H-TAB	0	0	0	1	0	0	1	011
LF	0	0	0	1	0	1	0	012
V-TAB	0	0	0	1	0	1	1	013
FORM	0	0	0	1	1	0	0	014
CR	0	0	0	1	1	0	1	015
X-ON	0	0	1	0	0	0	1	021
X-OFF	0	0	1	0	0	1	1	023
←	1	0	1	1	1	1	0	136
→	1	0	1	1	1	1	1	137

2-34. The remote control inputs are applied to the 6011A through a 24 pin connector mounted on the rear panel. Table 2-3 lists the pins and the input or output data carried on that line. The operational meaning of the data being transferred through these lines is also provided. Timing the data transfer is controlled by the DRY (Data Ready) input on pin 6 and the BSY (Busy) output on pin 7. Figure 2-2 illustrates the control of the data transfer.

2-35. FIXED FORM REMOTE PROGRAMMING

2-36. The fixed form of remote control input is presented in Table 2-4. An ASCII character is assigned to each digit of the display and the separate operating functions. After the digit position or function has been addressed, a second ASCII character is sent to place the correct number in the digit or to call the precise function. The following examples illustrate the fixed form of remote programming. Use Table 2-2 to translate the ASCII character into bit word form.

EXAMPLE: FIXED FORM PROGRAM

DESIRED OUTPUT

- 1. Frequency - 8.36785 MHz
- 2. FM — OFF
AM — OFF
RANGE — HIGH
- 3. Output Level — 2.683V rms into a 50 ohm load.

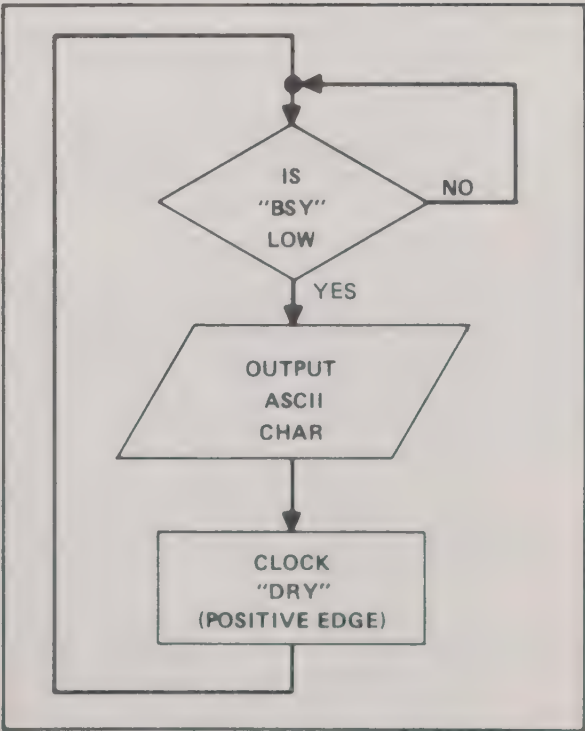


Figure 2-2. DATA TRANSFER

Table 2-3. REMOTE CONTROL CONNECTIONS

PIN NO.	DATA NAME	DATA DESCRIPTION
1	A D B 1	Four of eight ASCII Data Bit input lines (High True)
2	A D B 2	
3	A D B 3	
4	A D B 4	
5	POWER ON	+5 volt indicates 6010A power is on
6	DRY	Data Ready: Positive edge trigger indication, from the remote programmer, that the input data is ready for transfer.
7	BSY	Busy indication: High true indication that the 6010A is busy reading the input data.
<i>NOTE</i> <i>The input data to the 6010A must be held constant until the BSY line goes low.</i>		
8	$\overline{\text{PRD}}$	Low = processor done (strobe)
9	$\overline{\text{REMS}}$	Remote control order: Low input to order 6010A remote operation
10	SPARE	
11	ROL	Reduce Output Level: High true indication that the 6010A is being programmed to produce an output in excess of 5V rms.
12	SPARE	
13	A D B 5	Four of eight ASCII Data Bit input lines.
14	A D B 6	
15	A D B 7	
16	A D B 8	
17	SPARE	
18	SPARE	
19	RC FORMAT	Remote Control Format: Fixed form remote control is called when pin 19 is open or high. Free form remote control is called when pin 19 is pulled low.
20	SPARE	
21	SPARE	
22	SPARE	
23	SPARE	
24	GND	Ground: Provides a connection to 6010A logic common.

Table 2-4. FIXED FORM REMOTE PROGRAM

ADDRESS CHAR.	ADDRESSED POSITION	POSITION INPUT DATA			
A	MSD	} OUTPUT FREQUENCY			
B	2SD				
C	3SD				
D	4SD				
E	5SD				
F	6SD				
G	LSD				
J	FM,AM, AND RANGE	ASCII CHAR.	RANGE	FM	AM
		0	Low	Off	Off
		1	Low	Off	On
		2	Low	On	Off
		3	Low	On	On
		4	High	Off	Off
		5	High	Off	On
		6	High	On	Off
		7	High	On	On
Q	MSD	} OUTPUT LEVEL			
R	2SD				
S	3SD				
T	4SD				
U	LSD				
W	ATTEN- UATOR	Digits 0 thru 7 (0 provides 0 dB attenuator and 7 provides 70 dB) The attenuation will be displayed on the dB, mV, and V annunciators in binary coded decimal, dB = 10, mV = 20, and V = 40.			
P	CLEAR	Clear all data entered.			

- a. To select the frequency:
- Enter A to address MSD then 0.
- Enter B to address 2SD then 8.
- Enter C to address 3SD, then 3.
- Enter D to address 4SD, then 6.
- Enter E to address 5SD, then 7.

Enter F to address 6SD, then 8.

Enter G to address LSD, then 5.

- b. To obtain range and modulation:
- Enter J to address range and modulation, then 4 to obtain HIGH range, FM – OFF, and AM – OFF
- c. To obtain the output level:

NOTE

Fixed form remote programming requires two types of input data to control the output level. Individual digit inputs to a Digital-to-Analog (D/A) converter determines the output level of an amplifier, with attenuator control then providing output attenuation in 10 dB steps from 0 dB to 70 dB. Table 2-5 lists the 6011A output voltages (terminated and open circuit) that correspond to the optimum switching points in the combination of digit and attenuator programming.

Enter Q to address MSD, then 5.

Enter R to address 2SD, then 3

Enter S to address 3SD, then 6.

Enter T to address 4SD, then 6.

Enter U to address LSD, then 0.

Enter W to address the attenuator, then 0.

NOTE

When the AM function is selected, the digit inputs to the A/D for the lower limit of the 0 dB attenuator sitting through the lower limit of the 70 dB attenuator setting should be one-half of the value listed in Table 2-5. This allows enough range within the D/A to accommodate maximum amplitude modulation.

2-37. FREE FORM REMOTE INPUTS.

2-38. The free form mode of remote data input, presented in Table 2-6, provides freedom of data entry equal to that of the front panel keyboard and edit controls. The ASCII characters have been selected to represent a key of the front panel or a function of the edit control (decade selection and digit increment or decrement). Note that some of the functions require a numeric entry to indicate the state of the function. Refer to Table 2-2 for the seven bit data word for each character used. The following example will illustrate the free form mode of remote control.

EXAMPLE: FREE FORM PROGRAM**DESIRED OUTPUT**

1. Frequency — 7.42691 MHz
2. AM — OFF
3. FM — OFF
4. Output Level — 41.34 dB

- a. To obtain the output frequency, enter the ASCII data in the following order; digit 7, decimal point, digit 4, digit 2, digit 6, digit 9, digit 1, E (for exponent), digit 6, and H (for Hz).

NOTE

All frequency input data is in Hz. The exponent (E) key allows the entry in Hz to be raised to some power of ten to provide for kHz and MHz outputs.

- b. To program amplitude modulation off, enter A (for AM), then digit 0.
- c. To program frequency modulation off, enter F (for FM), then digit 0.
- d. To obtain the output level, enter the ASCII data in the following order; minus sign, digit 4, digit 1, decimal point, digit 3, digit 4, Y (to select output level in dB).

NOTE

The output level can be selected in volts and or, by using the minus sign and exponent inputs, full resolution millivolts.

**Table 2-5. FIXED FORM PROGRAMMING
FOR OUTPUT LEVEL**

DIGIT INPUT TOD/A	ATTEN IN dB	OUTPUT LEVEL	
		TERM	OPEN
99999	0	5.000V rms	10.00V rms
25119	0	1.256V rms	2.512V rms
79433	10	1.255V rms	2.511V rms
25119	10	397.2 mV rms	794.4 mV rms
79433	20	397.1 mV rms	794.3 mV rms
25119	20	125.6 mV rms	251.2 mV rms
79433	30	125.5 mV rms	251.1 mV rms
25119	30	39.72 mV rms	79.44 mV rms
79433	40	39.71 mV rms	79.43 mV rms
25119	40	12.56 mV rms	25.12 mV rms
75433	50	12.55 mV rms	25.11 mV rms
25119	50	3.972 mV rms	7.944 mV rms
75433	60	3.971 mV rms	7.943 mV rms
25119	60	1.256 mV rms	2.512 mV rms
75433	70	1.255 mV rms	2.511 mV rms
25119	70	.3972 mV rms	.7944 mV rms

Table 2-6. FREE FORM REMOTE INPUTS

ASCII CHAR.	FUNCTION	NOTES
A(N)	AM	N (0 = AM OFF, 1 = AM ON)
B	NOT USED	
C	NOT USED	
D	DECREMENT	Decreases edit decade digit by one each entry.
E	EXPONENT	Calls for exponential notation of the input digits. Negative exponents may be entered by sending a minus sign immediately after the E, then the exponents digital value.
F(N)	FM	N (0 = FM OFF, 1 = FM ON)
G(N)	SELECT FREQUENCY	Selects edit decade in frequency display N (1 - 7).
H	Hz	Hertz
I	INCREMENT	Increases edit decade digit by one for each entry.
J	NOT USED	
K	NOT USED	
L	LOW RANGE	Selects Low range
M	NOT USED	
N	NOT USED	
O	NOT USED	
P	NOT USED	
Q	NOT USED	
R(N)	RECALL	N (1-9) or N (<, =, >)
S(N)	STORE	N (1-9) or N (<, =, >)
NOTE < represents LEVEL LIMIT = represents REFERENCE LEVEL > represents REFERENCE FREQUENCY		
T	NOT USED	
U	HIGH RANGE	Selects high range
V	VOLT	Selects level in volts
W(N)	SELECT LEVEL	Selects edit decade in level display N(1-4)
X(N)	STEP SIZE	N(1-9)
Y	DECIBEL	
Z	NOT USED	
+	PLUS SIGN	
-	MINUS SIGN	
.	DECIMAL POINT	

Section 3

Theory of Operation

3-1. INTRODUCTION

3-2. This section of the manual contains the theory of operation for the Model 6011A Synthesized Signal Generator. The theory is presented at a block diagram level; referring to the block diagram in Figure 3-1. The fundamental operation of each block as well as the functional relationships of the blocks will be discussed.

3-3. BLOCK DIAGRAM ANALYSIS

3-4. Input Output Module (6011A-4101)

3-5. The Input Output Module contains the 10 MHz crystal controlled oscillator from which the generator develops the 10 Hz to 11 MHz output. A level detector is used to disable the internal oscillator when an external reference source is applied to the rear panel EXT REF input jack. The 10 MHz reference signal is applied, via J3, to the main PCB to be used as a timing signal and to provide the rear panel REF OUT signal. The 10 MHz reference is also applied to a ten-to-one (10/1) divider to create a 1 MHz signal for the 6 Digit Generator Module. Within the Input Output Module the 10 MHz reference signal is applied to a 50/1 divider and a times-two (x2) frequenc

3-6. The 0.2 MHz output of the 50/1 divider is selected in low range and the 20 MHz output of the x2 multiplier selected in high range as an input to the level control amplifier. The level control input signal to the amplifier comes from the error amplifier in the Amplitude D/A Module. The output

of the level control amplifier will be a signal, 20 MHz in high range 200 kHz in low range, the amplitude of which is determined by the signal from the error amplifier. The level control output signal is applied to a mixer. The other input to the mixer, when operating in high range, is a 20 to 31 MHz signal from the 6-Digit Generator Module. When the low range is selected a 100/1 divider reduces the signal frequency to 0.2 to 0.31 MHz. A Low Pass Filter (LPF) at the output of the mixer allows only the difference frequency (10 Hz to 11 MHz) to pass when in high range. In low range an additional filter is added to the mixer output to pass a lower difference frequency of 10 Hz to 110 kHz. An output amplifier provides sufficient gain, over the operating frequency range, to supply up to the 5 volts rms output (into 50 ohms) required. The rms sensor provides feedback to the Amplitude D/A Module error amplifier that will cancel the error amplifier output when the selected output and actual output match.

3-7. 6 Digit Generator Module (6010A-4102)

3-8. The 1 MHz input signal to the 6-Digit Generator is applied to a ten-to-one divider producing a 100 kHz phase control signal for the E and F decade step loop. The 100 kHz signal is divided by two to provide a 50 kHz phase control signal for the C and D decades, then divided by two again to produce the 25 kHz phase control signal for the A and B decades. The 25, 50, and 100 kHz signals are applied to phase detectors in the A and B, C and D, and E and F decade step loops respectively. Each step loop comprises a Voltage Controlled Oscillator (VCO), and N/1 Divider, and a phase de-

lector. Because the operation of all three step loops is basically the same, only the A and B decade loop will be discussed.

3-9. Frequency control commands, generated by the front panel keyboard or remote control inputs, determine the division ratio so that the output of the N/1 divider is maintained at 25 kHz. For example: when the frequency control commands establish a 1100/1 division ratio, the output of the VCO is divided by 1100 the resulting frequency is 25 kHz. If the frequency commands change the division ratio to 1050/1, the 27.5 MHz VCO frequency will cause the output of the divider to be greater than 25 kHz. The phase detector produces a control voltage output to the VCO whenever the N/1 divider output is not exactly 25 kHz. The new division ratio (1050/1) will cause the VCO output frequency to change from 27.5 MHz to 26.26 MHz. The step loop operation of the C and D decades and the E and F decades is the same as that of the A and B decades. The division ratios of the dividers and the frequency outputs of the VCO change but the basic operation is the same.

3-10. Two main loops, one for the C and D decade and one for the E and F decade, are used to combine the output of the decades' step loop with the frequency output from the preceding decade. The output frequency of decades A and B is divided by the 50/1 divider to provide an input signal to the phase detector at a frequency between 0.55 and 0.50 MHz. The output of the phase detector causes the 25 - 20 MHz VCO to produce a frequency that, when mixed with the C and D decades step loop frequency, will match the frequency of the A and B decades output. The output of the C and D decades main loop VCO is divided by the 50/1 divider and applied to the phase detector in the E and F decades main loop. The 20-31 MHz VCO output signal is mixed with the step loop output to produce a signal equal in frequency to the signal coming from the C and D decades. In this manner, any change in the A and B decades output frequency causes a change in the C and D decades main loop frequency which then causes a change in the E and F decades main loop frequency. The final result being that the output of the 20-31 MHz VCO is a frequency resulting from the combined outputs of the three step loops. The output of the 6-Digit Generator Module is connected to the Input-Output Module.

3-11. Main PCB (6011A-4004) and Display PCB (6011A-4005)

3-12. The Main PCB contains the power supplies a divider network for selecting the REF OUT frequency, and the controller (micro-processor). The Display PCB contains the keyboard, for data entry, and the display. The power supply on the main PCB provides operating and logic power supply for the entire instrument. (Three +5 volt supplies are used because of the total +5 volt power requirement and to eliminate the possible interference between logic circuitry.)

3-13. The 10 MHz reference signal from the Input-Output Module is applied to 2/1 and 10/1 dividers to provide the selectable REF OUT signals of 5 MHz or 1 MHz. The 5 MHz reference output signal is also used as a clock input to the controller. The controller receives control data from the front panel keyboard and produces commands to control the 6011A circuitry. The controller provides frequency commands to the 6-Digit Generator Module, range commands to the Input-Output Module, attenuator commands to the Attenuator Module, level commands to the Amplitude D/A Module, and selects Frequency Modulation (FM) when the FM Option Module is installed.

3-14. Attenuator Module (6011A-4103)

3-15. The Attenuator Module comprises a 10 dB per step attenuator and a comparator. The controller determines, from the output level selected, the amount of attenuation to be applied to the Input-Output Module signal to obtain the selected output level. Binary coded decimal attenuator commands from the controller select a combination of the 10, 20 or 40 dB attenuators to produce the correct output level. The comparator produces a TTL compatible squarewave output from the 10 Hz to 11 MHz signal input from the Input-Output Module. The TTL OUT connector will provide the correct TTL output level regardless of the output level or attenuator settings.

3-16. FM Option Module (6010A-4107)

3-17. When frequency modulation is selected on the front panel keyboard a controller command switches the Input-Output Module reference frequency from the 10 MHz internal source to the FM Option output frequency. The FM Option consists of a 10 MHz voltage controlled crystal oscillator (VCXO), the output frequency of which is controlled by a dc voltage input. A positive five volt dc input to the rear panel FM IN connector will cause a 20 kHz increase in the 10 MHz VCXO output frequency in high range, and a 200 Hz increase in low range. A negative five volt input causes a 20 kHz and 200 Hz decrease in output frequency in the high range and low range respectively. The rate of modulation in both ranges can be from dc to 10 kHz.

3-18. Phase Locked Input Option Module (6010A-4106)

3-19. The Phase Locked Input Option provides for instrument operation using reference frequencies that are subharmonics of 10 MHz. Reference frequencies such as 1, 2, 2.5, 5, and 10 MHz can be applied to the EXT REF input connector. The 10 MHz phase locked loop produces a 10 MHz reference signal for the Input-Output Module that directly represents the accuracy of the external reference signal.

Section 4

Maintenance

4.1. INTRODUCTION

4.2. This section of the manual contains information and instructions concerning the service, maintenance access, operational evaluation, and calibration of the Model 6011A Synthesized Signal Generator. A list of recommended test equipment for instrument evaluation is provided in Table 4-1.

Table 4-1. REQUIRED TEST EQUIPMENT

EQUIPMENT NOMEN- CLATURE	REQUIRED CHAR- ACTERISTICS	RECOMMENDED MODEL
Frequency Counter	0.1 Hz Resolution and External Time-base Input	Fluke Model 1950A
Oscilloscope	15 MHz Bandwidth	Tektronix Model 760B
Plug - in	0.5mV/cm Sensitivity	Tektronix 7A15AN Plug-in Amplifier
Signal Generator	10 kHz Output at 0.25V peak to 5V peak	Wavetek Model 130
50 ohm load	50 ohm feed through termination	Tektronix Part No. 011-0049-01

4.3. SERVICE INFORMATION

4.4. Each instrument manufactured by the John Fluke Mfg. Co., Inc. is warranted for a period of one year upon delivery to the original purchaser. The WARRANTY is located at the front of the manual.

4.5. Factory authorized calibration and service for each Fluke product is available at various world-wide locations. A complete list of the authorized service centers is located in Section 7 of this manual. Shipping information is presented in Section 2. If requested, an estimate of repair costs will be provided the customer before any repair work is begun on instruments that are beyond the warranty period.

4.6. MAINTENANCE ACCESS

4.7. To gain access to the major sections of the signal generator, proceed as follows:

- a. Turn off the signal generator and disconnect the power cord.
- b. Remove the top and bottom dust covers. This will expose the INPUT/OUTPUT module (as viewed from the top) and the SIX-DIGIT GENERATOR module (as viewed from the bottom).
- c. Remove the six screws (three each side) securing the INPUT/OUTPUT module in place.

NOTE

There are four screws on each side of the module; remove the front three. The rear screw is a pivot screw that allows the module to be swung away for access to interior module(s); loosen it slightly.

- d. Lift the front of the INPUT/OUTPUT module; swing it up and back until it comes to rest against the stop. This provides access to the ATTENUATOR module and the MAIN PCB.
- e. The SIX-DIGIT GENERATOR module can be swung away to provide access to the bottom of the MAIN PCB. Remove the six screws (three front screws on each side) securing the module in place; loosen the rear two pivot screws. Swing the module back to expose the bottom of the MAIN PCB.

4-8. GENERAL MAINTENANCE

4-9. Cleaning

4-10. Clean the instrument periodically to remove dust, grease, and other contamination. Use the following procedure:

- a. Clean the interior with clean, dry air at low pressure. When printed circuit boards require cleaning, first spray them with Freon T.F. Degreaser (Miller Stepensen Company, Inc.) and then remove the dirt with clean, dry air at low pressure.
- b. Clean the front panel and exterior surfaces with anhydrous ethyl alcohol or a soft cloth dampened in a mild solution of detergent and water.

4-11. Fuse Replacement

4-12. The line power fuse is located in a fuse holder mounted on the rear panel of the instrument. This fuse provides protection for the power supply circuitry. Replace an open fuse with a 1A Slo-Blo fuse (115V operation), or a ½A Slo-Blo fuse (230V operation).

4-13. OPERATIONAL EVALUATION

4-14. The following procedure checks the overall operation of the 6011A. This procedure is especially suited for performance evaluation during receiving inspection and checking for inoperative conditions during routine maintenance and repair of the instrument.

4-15. The operation of the 6011A can be observed by attaching test equipment to the signal generator as follows:

- a. Attach an oscilloscope (see Table 4-1 for recommended test equipment), through a 50 ohm in-line load, to the 6011A front panel output signal jack.
- b. Connect a frequency counter, through a 50 ohm in-line load, to the TTL OUT connector on the 6011A rear panel.

- c. Connect the 6011A REF OUT signal to the external reference input connector on the frequency counter.

4-16. Exercise the 6011A in the following manner to evaluate basic instrument operation:

- a. Enter 88888.8 Hz; insure that all segments of each digit are on.
- b. Enter 88.88 mV; insure that all segments of each digit are on.
- c. Rotate the edit control (DECADE) counterclockwise; the bright digit should progress from the least significant digit of the level display through each digit of both displays, then reappear in the least significant digit of the level display.
- d. Move the bright digit to the most significant digit of the level display.
- e. Rotate the edit control (DIGIT) counterclockwise one detent at a time; observe the oscilloscope for a decrease in the level of the 6011A output signal.
- f. Move the bright digit to the second significant digit of the frequency display.
- g. Press the STEP SIZE key, then the 2 digit key.
- h. Rotate the edit control (DIGIT) counterclockwise one detent at a time; observe the frequency counter for a two kHz decrease in the 6011A output frequency for each detent.
- i. Press the ACTUAL key; note that all the previously inactive decimal points flash on and off.
- j. Press the last key; the decimal points should stop flashing.
- k. Use the edit control to return the output frequency 88888.8 Hz and the output level to 88.88 mV.
- l. Press the memory STORE key, then reference FREQ key; the frequency display should show a zero in the least significant digit and a plus sign.
- m. Press the memory STORE key, then reference LEVEL key; the level display should show a zero in each digit position and a plus sign.

NOTE

The 6011A output should still be 88888.8 Hz at 88.88 mV, as indicated on the oscilloscope and frequency counter.

- n. Enter 22.2222 kHz and 0.022 volts
- o. Press the memory STORE key, then the 1 digit key; the actual output of the 6011A should be 111.11 kHz at 110.8 mV.
- p. Enter -.0444444 MHz and -6.00 dB.
- q. Press the memory STORE key, then the 2 digit key; the actual output of the 6011A should be 44.4444 kHz at 44.54 mV.
- r. Press the ACTUAL key; the display should show 44.4444 kHz and 44.54 mV with all unused decimal points flashing.
- s. Enter 100 mV.
- t. Press the memory STORE key, then the level LIMIT key.
- u. Press the memory RECALL key, then the 1 digit key; the display should show 22.2222 kHz and a flashing 22.00 mV.

NOTE

The level display flashes because the reference level (88.88 mV) plus the level stored in location 1, (22.00 mV) is greater than the 100 mV level limit. The output of the 6011A will remain at 44.54 mV (the last valid output level).

4-17. Operational evaluation of the amplitude modulation function of the 6011A requires the connection of an analog voltage source to control the percent of modulation. Connect the output of the test equipment signal generator to the AM IN connector on the rear panel of the 6011A. The following procedure describes how to check out amplitude modulation operation.

- a. Turn the 6011A POWER switch off, then on again; this should clear the instrument program to zero output frequency and level.
- b. Select a 100 kHz output frequency from the 6011A at an output level of 3 volts.
- c. Adjust the test equipment signal generator for an output frequency of 10 kHz at an output level of 3 volts; the oscilloscope should show a 100 kHz signal being modulated at a 10 kHz rate.
- d. Increase the AM IN signal level until the REDUCE LEVEL indicator on the 6011A front panel comes on.
- e. Turn the 6011A power off and disconnect the test equipment.

4-18. CALIBRATION

4-19. The calibration procedure described below is intended to provide the checks and adjustments necessary to maintain proper instrument operation. This procedure should be performed once every six months. The specifications for the test equipment (True RMS Differential Voltmeter and Frequency Counter) are presented in Table 4-1. Proceed with the 6011A calibration as follows:

- a. Connect the true rms voltmeter, terminated with 50 ohms, to the 6011A OUTPUT connector.
- b. Connect the frequency counter input, terminated in 50 ohms, to the 6011A TTL OUT connector.
- c. Connect the 6011A 1MHz REF OUT signal to the external timebase input on the counter.

NOTE

The 1MHz external timebase input to the counter will cause the decimal point in the counter display to be offset one place to the right. Mentally reposition the decimal point.

- d. Program the 6011A to provide a 35 kHz output signal in the LO range.
- e. Program the 6011A for a 5 volt rms output.
- f. Remove the top dust cover from the 6011A.
- g. Adjust the level control R92 (access through the hole in the top of the Input/Output module) for an output indication on the rms voltmeter of 5 ± 0.02 volts (5 volts $\pm 0.4\%$).
- h. Check the frequency counter display for an indication of 35 kHz (350 kHz will be displayed due to the 1MHz timebase input).
- i. Set the mode switch on the differential voltmeter to the 10% NULL position. (Full scale deflection of the meter indicates $\pm 10\%$ deviation from the dialed plus five volts.)
- j. Program the 6011A to produce the output signals indicated in Table 4-2. The differential voltmeter indication should not vary more than $\pm 6\%$ over the entire frequency range.

Table 4-2. OUTPUT LEVEL CHECK POINTS

PROGRAMMED FREQUENCY	RANGE
10 Hz	LO
100 Hz	LO
1 kHz	LO
5 kHz	LO
10 kHz	LO
20 kHz	LO
50 kHz	LO
90 kHz	LO
100 kHz	LO
109.999 kHz	LO
10 Hz	HI
1 kHz	HI
10 kHz	HI
100 kHz	HI
1 MHz	HI

Section 5

Lists of Replaceable Parts

To be supplied in final manual.

Section 6

Option & Accessory Information

To be supplied in final manual.

Section 7

General Information

7-1. This section of the manual contains generalized user information as well as supplemental information to the

Lists of Replaceable parts contained in Section 5. The following information is presented in this section:

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7-4.	Sales Representatives - Domestic	7-11
7-5.	Sales Representatives - International	7-13

Table 7-1. LIST OF ABBREVIATIONS AND SYMBOLS

A or amp	ampere	cont	continue
ac	alternating current	crt	cathode-ray tube
af	audio frequency	cw	clockwise
a/d	analog-to-digital	d/a	digital-to-analog
assy	assembly	dac	digital-to-analog converter
AWG	american wire guage	dB	decibel
B	bel	dc	direct current
bcd	binary coded decimal	dmm	digital multimeter
°C	Celsius	dvm	digital voltmeter
cap	capacitor	elect	electrolytic
ccw	counter clockwise	ext	external
cer	ceramic	F	farad
cermet	ceramic to metal (seal)	°F	Fahrenheit
ckt	circuit	FET	field-effect transistor
cm	centimeter	ff	flip-flop
cmrr	common mode rejection ratio	freq	frequency
comp	composition	FSN	federal stock number

Table 7-1. LIST OF ABBREVIATIONS AND SYMBOLS (Continued)

g	gram	opnl ampl	operational amplifier
G	giga (10^9)	p	pico (10^{-12})
gd	guard	para	paragraph
Ge	germanium	pcb	printed circuit board
GHz	gigahertz	pF	picofarad
gmV	guaranteed minimum value	pn	part number
gnd	ground	(+) or pos	positive
H	henry	pot	potentiometer
hd	heavy duty	p-p	peak-to-peak
hf	high frequency	ppm	parts per million
Hz	hertz	PROM	programmable read-only memory
IC	integrated circuit	psi	pound-force per square inch
if	intermediate frequency	RAM	random-access memory
in	inch(es)	rf	radio frequency
intl	internal	rms	root mean square
I/O	input/output	ROM	read-only memory
k	kilo (10^3)	s or sec	second (time)
kHz	kilohertz	scope	oscilloscope
k Ω	kilohm(s)	SH	shield
kV	kilovolt(s)	Si	silicon
lf	low frequency	serno	serial number
LED	light-emitting diode	sr	shift register
LSB	least significant bit	Ta	tantalum
LSD	least significant digit	tb	terminal board
M	mega (10^6)	tc	temperature coefficient or temperature compensating
m	milli (10^{-3})	tcxo	temperature compensated crystal oscillator
mA	milliampere(s)	tp	test point
max	maximum	u or μ	micro (10^{-6})
mf	metal film	uhf	ultra high frequency
MHz	megahertz	us or μ s	microsecond(s) (10^{-6})
min	minimum	uut	unit under test
mm	millimeter	V	volt
ms	millisecond	v	voltage
MSB	most significant bit	var	variable
MSD	most significant digit	vco	voltage controlled oscillator
MTBF	mean time between failures	vhf	very high frequency
MTTR	mean time to repair	vlf	very low frequency
mV	millivolt(s)	W	watt(s)
mv	multivibrator	ww	wire wound
M Ω	megohm(s)	xfmr	transformer
n	nano (10^{-9})	xstr	transistor
na	not applicable	xtal	crystal
NC	normally closed	xtlo	crystal oscillator
(-) or neg	negative	Ω	ohm(s)
NO	normally open	μ	micro (10^{-6})
ns	nanosecond		

Table 7-2. FEDERAL SUPPLY CODES FOR MANUFACTURERS

00213	Sage Electronics Corp. Rochester, New York	04009	Arrow Hart and Hegemen Electronic Company Hartford, Connecticut
00327	Welwyn International, Inc. Westlake, Ohio	04062	Replaced by 72136
00656	Aerovox Corp. New Bedford, Massachusetts	04202	Replaced by 81312
00686	Film Capacitors Passaic, New Jersey	04217	Essex Wire Corp. Wire & Cable Div. Anaheim, California
00779	AMP Inc. Harrisburg, Pennsylvania	04221	Aemco, Div. of Midtex Inc. Mankato, Minnesota
01121	Allen-Bradley Co. Milwaukee, Wisconsin	04222	Aerovox Corp. (H-Q) Myrtle Beach, South Carolina
01281	TRW Semiconductors Lawndale, California	04645	Replaced by 75376
01295	Texas Instruments, Inc. Semiconductor Components Div. Dallas, Texas	04713	Motorola Semiconductor Products Inc. Phoenix, Arizona
01537	Motorola Communications & Electrical Inc. Franklin Park, Illinois	05082	Replaced by 94154
01686	RCL Electronics Inc. Manchester, New Hampshire	05236	Jonathan Mfg. Co. Fullerton, California
01730	Deleted	05277	Westinghouse Electric Corp. Semiconductor Dept. Youngwood, Pennsylvania
01884	Dearborn Electronics Inc. Orlando, Florida	05278	Replaced by 43543
02114	Ferroxcube Corp. Saugerties, New York	05397	Union Carbide Corp. Electronics Div. Cleveland, Ohio
02395	Rason Mfg. Co. Brooklyn, New York	05279	Southwest Machine & Plastic Co. Los Angeles, California
02533	Snelgrove, C.R. Co., Ltd. Don Mills, Ontario, Canada M3B 1M2	05397	Union Carbide Corp. Electronics Div. New York, New York
02606	Replaced by 15801	05571	Sprague Electric Co. Pacific Div. Los Angeles, California
02660	Amphenol-Borg Elect. Corp. Broadview, Illinois	05574	Viking Industries Chaisworth, California
02799	Areo Capacitors, Inc. Torrence, California	05704	Alac, Inc. Glendale, California
03508	General Electric Co. Semiconductor Products Syracuse, New York	05820	Wakefield Engineering Ind. Wakefield, Massachusetts
03614	Replaced by 71400	06001	General Electric Company Capacitor Department Irmo, South Carolina
03651	Replaced by 44655	06136	Replaced by 63743
03797	Eldema Corp. Compton, California	06383	Panduit Corp Tinley Park, Illinois
03877	Transistron Electronic Corp. Wakefield, Massachusetts	06473	Amphenol Space & Missile Sys. Chatsworth, California
03888	Pyrofilm Resistor Co., Inc. Cedar Knolls, New Jersey	06555	Beede Electrical Instrument Co. Penacook, New Hampshire
03911	Clairex Corp. New York, New York	06739	Electron Corp. Littleton, Colorado
03980	Muirhead Instruments, Inc. Mountainside, New Jersey		

Table 7-2. FEDERAL SUPPLY CODES FOR MANUFACTURERS (Continued)

06743	Clevite Corp. Cleveland, Ohio	09969	Dale Electronics Inc. Yankton, S Dakota
06751	Semcor Div., Components, Inc. Phoenix, Arizona	11236	CTS of Berne Berne, Indiana
06860	Gould National Batteries Inc. City of Industry, California	11237	Chicago Telephone of Calif. Inc., (CTC) Paso Robles, California
06980	Varian-Eimac San Carlos, California	11358	Discontinued
07047	Ross Milton, Co., The South Hampton, Pennsylvania	11403	Best Products Co. Chicago, Illinois
07115	Replaced by 14674	11503	Keystone Mfg. Div. of Avis Industrial Corp. Warren, Michigan
07138	Westinghouse Electric Corp., Electronic Tube Division Elmira, New York	11711	General Instrument Corp Rectifier Division Hickville, New York
07233	TRW Electronic Components Cinch Graphic City of Industry, California	11726	Qualidyne Corp. Santa Clara, California
07256	Silicon Transistor Corp. Garden City, New York	12014	Chicago Rivet & Machine Co. Bellwood, Illinois
07263	Fairchild Semiconductor Div. of Fairchild Camera & Instrument Corp. Mountain View, California	12040	National Semiconductor Corp. Danbury, Connecticut
07344	Bircher Co., Inc. Rochester, New York	12060	Diodes, Inc. Chatsworth, California
07792	Lerma Engineering Corp. Northampton, Massachusetts	12136	Philadelphia Handle Co. Camden, New Jersey
07910	Teledyne Corp. (Continental Device) Hawthorne, California	12300	Potter-Brumfield Division AMF Canada LTD. Guelph, Ontario, Canada
08225	Industro Transistor Corp. Long Island City, New York	12323	Presin Co., Inc. Shelton, Connecticut
08261	Spectra Strip Corp Garden Grove, California	12327	Freeway Washer & Stamping Co. Cleveland, Ohio
08530	Reliance Mica Corp. Brooklyn, New York	12400	Replaced by 75042
08792	Discontinued	12615	U.S. Terminals Inc. Cincinnati, Ohio
08806	General Electric Co. Miniature Lamp Dept. Cleveland, Ohio	12617	Hamlin Inc. Lake Mills, Wisconsin
08863	Nylomatic Corp. Norrisville, Pennsylvania	12697	Clarostat Mfg. Co. Dover, New Hampshire
08988	Skottie Electronics Inc. Archbald, Pennsylvania	12749	James Electronics Chicago, Illinois
09214	G.E. Semi-Conductor Products Dept. Auburn, New York	12856	Micrometals Sierra Madre, California
09353	C and K Components Watertown, Massachusetts	12954	Dickson Electronics Corp. Scottsdale, Arizona
09423	Scientific Components, Inc. Santa Barbara, California	12969	Unitrode Corp. Watertown, Massachusetts
09922	Burndy Corp. Norwalk, Connecticut	13103	Thermalloy Co. Dallas, Texas
		13327	Solitron Devices Inc. Tappan, New York

Table 7-2. FEDERAL SUPPLY CODES FOR MANUFACTURERS (Continued)

13511	Amphenol Corp. Los Gatos, California	18083	Deleted
13606	Sprague Electric Co. Transistor Div. Concord, New Hampshire	18178	Vactec Inc. Maryland Heights, Missouri
13839	Replaced by 23732	18324	Signetics Corp. Sunnyvale, California
14099	Semtech Corp. Newbury Park, California	18612	Vishay Intertechnology Inc. Malvern, Pennsylvania
14193	California Resistor Corp. Santa Monica, California	18736	Voltronics Corp. Hanover, New Jersey
14298	American Components, Inc. Conshohocken, Pennsylvania	18927	G T E Sylvania Inc. Precision Material Group Parts Division Titusville, Pennsylvania
14655	Cornell-Dubilier Electronics Newark, New Jersey	19429	Discontinued, use 89536
14674	Discontinued, see 16299	19451	Perine Machinery & Supply Co. Seattle, Washington
14752	Electro Cube Inc. San Gabriel, California	19701	Electra Mfg. Co. Independence, Kansas
14869	Replaced by 96853	25084	Enochs Mfg. Co. Indianapolis, Indiana
15636	Elec-Trol Inc. Northridge, California	20891	Self-Organizing Systems, Inc. Dallas, Texas
15801	Fenwal Electronics Inc. Framingham, Massachusetts	21604	Buckeye Stamping Co. Columbus, Ohio
15818	Amelco Semiconductor Div. of Teledyne Inc. Mountain View, California	21845	Solitron Devices Inc. Transistor Division Riviera Beach, Florida
15849	USECO, Inc. Mt. Vernon, New York	22767	ITT Semiconductors Div. of ITT Palo Alto, California
15898	International Business Machines (IBM) Essex Junction, Vermont	23050	Product Comp. Corp. Mount Vernon, New York
15909	Replaced by 17870	23732	Tracor Rockville, Maryland
16299	Corning Glass Raleigh, North Carolina	23880	Stanford Applied Engrng. Santa Clara, California
16332	Replaced by 28478	23936	Pamotor Div., Wm. J. Purdy Co. Burlingame, California
16473	Cambridge Scientific Ind. Inc. Cambridge, Maryland	24248	Southco Div. of South Chester Corp. Lester, Pennsylvania
16742	Paramount Plastics Downey, California	24355	Analog Devices Inc. Norwood, Massachusetts
16758	Delco Radio Div. of General Motors Kokomo, Indiana	24655	General Radio Co. West Concord, Massachusetts
17001	ITT Cannon Santa Ana, California	24759	Lenox-Fugle Electronics Plainfield, New Jersey
17069	Circuit Structures Lab. Upland, California	25088	Siemen Corp. Isilen, New Jersey
17338	High Pressure Eng. Co., Inc. Oklahoma City, Oklahoma	25403	Amperex Electronic Corp. Semiconductor & Receiving Tube Division Slatersville, Rhode Island
17856	Siliconix, Inc. Sunnyvale, California		
17870	Daven Div. of Thomas A. Edison Ind. - McGraw - Edison Co. Manchester, New Hampshire		

Table 7-2. FEDERAL SUPPLY CODES FOR MANUFACTURERS (Continued)

27014	National Semiconductor Corp. Santa Clara, California	49671	Radio Corp. of America New York, New York
27264	Molex Products Downers Grove, Illinois	49956	Raytheon Company Lexington, Maine
28213	Minnesota Mining & Mfg. Co. Consumer Products Div. St. Paul, Minnesota	50088	Mostek Corp. Carrollton, Texas
28425	Bohannon Industries Fort Worth, Texas	50579	Litronix Inc. Cupertino, California
28478	Deltrol Controls, Corp. Milwaukee, Wisconsin	51605	Scientific Components Inc. Linden, New Jersey
28480	Hewlett Packard Co. Palo Alto, California	53021	Sanamo Electric Co. Springfield, Illinois
28520	Heyman Mfg. Co. Kenilworth, New Jersey	54294	Shallcross, A Cutler-Hammer Co. Selma North Carolina
29083	Monsanto, Co., Inc. Santa Clara, California	55026	Simpson Electric Company Chicago, Illinois
29604	Stackpole Components Co. Raleigh, North Carolina	56289	Sprague Electric Co. North Adams, Massachusetts
30148	A B Enterprise Inc. ahoskie, North Carolina	58474	Superior Electric Co. Bristol, Connecticut
30323	Illinois Tool Works, Inc. Chicago, Illinois	60399	Torrington Mfg. Co. Torrington, Connecticut
31091	Optimax Inc. Colmar, Pennsylvania	62460	Deleted
32539	Mura Corp. Great Neck, New York	63743	Ward Leonard Electric Co. Mount Vernon, New York
32767	Griffith Plastic Products Co. Burlingame, California	64834	West Mfg. Co. San Francisco, California
32879	Advanced Mechanical Components Northridge, California	65092	Weston Instruments Inc. Newark, New Jersey
32897	Erie Technological Products, Inc. Frequency Control Div. Carlisle, Pennsylvania	66150	Winslow Tele-Tronics Inc. Asbury Park, New Jersey
32997	Bourns Inc. Trimpot Products Division Riverside, California	70563	Amperite Company Union City, New Jersey
33173	General Electric Co. Tube Dept. Owensboro, Kentucky	70903	Belden Mfg. Co. Chicago, Illinois
34333	Silicon General Westminister, California	71002	Birnbach Radio Co., Inc. New York, New York
34335	Advanced Micro Devices Sunnyvale, California	71236	"ELMENCO" Willimantic, Connecticut
37942	Mallory, P.R. & Co., Inc. Indianapolis, Indiana	71400	Bussmann Mfg. Div. of McGray - Edison Co. Saint Louis, Missouri
42498	National Company Melrose, Massachusetts	71450	CTS Corp. Elkhart, Indiana
43543	Nytronics Inc. Transformer Co. Div. Alpha, New Jersey	71468	ITT Cannon Electric Inc. Los Angeles, California
44655	Ohmite Mfg. Co. Skokie, Illinois	71482	Clare, C.P. & Co. Chicago, Illinois
		71590	Centralab Div. of Globe Union Inc. Milwaukee, Wisconsin

Table 7-2. FEDERAL SUPPLY CODES FOR MANUFACTURERS (Continued)

71707	Coto Coil Co., Inc. Providence, Rhode Island	74306	Piezo Crystal Co. Carlisle, Pennsylvania
71744	Chicago Miniature Lamp Works Chicago, Illinois	74542	Hoyt Elect. Instr. Works Penacook, New Hampshire
71785	Cinch Mfg. Co. & Howard B. Jones Div. Chicago, Illinois	74970	Johnson, E. F., Co. Waseca, Minnesota
72005	Driver, Wilber B., Co. Newark, New Jersey	75042	IRC Inc. (Div. of TRW) Philadelphia, Pennsylvania
72092	Replaced by 06980	75376	Kurz-Kasch, Inc. Dayton, Ohio
72136	Electro Motive Mfg. Co. Williamantic, Connecticut	75378	CTS Knights Inc. Sandwich, Illinois
72259	Nytronics Inc. Berkeley Heights, New Jersey	75382	Kulka Electric Corp. Mount Vernon, New York
72354	Deleted	75915	Littlefuse Inc. Des Plaines, Illinois
72619	Dialight Corp. Brooklyn, New York	76854	Oak Mfg. Co. Crystal Lake, Illinois
72653	G. C. Electronics Rockford, Illinois	77342	Potter & Brumfield Div. of Amer. Machine & Foundry Princeton, Indiana
72665	Replaced by 90303	77638	General Instrument Corp. Rectifier Division Brooklyn, New York
72794	Dzus Fastener Co., Inc. West Islip, New York	77969	Rubbercraft Corp. of Calif. LTD. Torrance, California
72928	Gudeman Co. (Gulton Ind.) Chicago, Illinois	78189	Shakeproof Div. of Illinois Tool Works Elgin, Illinois
72982	Erie Tech. Products Inc. Erie, Pennsylvania	78277	Sigma Instruments, Inc. South Braintree, Massachusetts
73138	Beckman Instruments Inc. Helipot Division Fullerton, California	78488	Stackpole Carbon Co. Saint Marys, Pennsylvania
73293	Hughes Aircraft Co. Electron Dynamics Div. Torrence, California	78553	Tinnerman Products Cleveland, Ohio
73445	Amperex Electronic Corp. Hicksville, New York	78136	Waldes Kohinoor Inc. Long Island City, New York
73559	Carling Electric Inc. Hartford, Connecticut	79497	Western Rubber Company Goshen, Indiana
73586	Circle F Industries Trenton, New Jersey	79963	Zierick Mfg. Corp. New Rochelle, New York
73734	Federal Screw Products, Inc. Chicago, Illinois	80031	Mepco Div. of Sessions Clock Co. Morristown, New Jersey
73743	Fischer Special Mfg. Co. Cincinnati, Ohio	80145	API Instruments Co. Chesterland, Ohio
73899	JFD Electronics Co. Brooklyn, New York	80183	Sprague Products North Adams, Massachusetts
73949	Guardian Electric Mfg. Co. Chicago, Illinois	80294	Bourns Inc. Riverside, California
74199	Quam Nichols Co. Chicago, Illinois	80583	Hammarlund Co., Inc. Mars Hill, North Carolina
74217	Radio Switch Corp. Marlboro, New Jersey	80640	Stevens, Arnold Inc. Boston, Massachusetts
74276	Signalite Inc. Neptune, New Jersey		

Table 7-2. FEDERAL SUPPLY CODES FOR MANUFACTURERS (Continued)

81073	Grayhill, Inc. La Grange, Illinois	88245	Litton Products Inc. Van Nuys, California
81590	Korby Mfg. Co. Seattle, Washington	88419	Use 14655
81312	Winchester Electronics Div. of Litton Industries Oakville, Connecticut	88690	Replaced by 04217
81439	Therm-O-Disc Inc. Mansfield, Ohio	89536	Fluke, John Mfg. Co., Inc. Seattle, Washington
81483	International Rectifier Corp. Los Angeles, California	89730	Replaced by 08806
81741	Chicago Lock Corp. Chicago, Illinois	90201	Mallory Capacitor Co. Indianapolis, Indiana
82305	Palmer Electronics South Gate, California	90215	Best Stamp & Mfg. Co. Kansas City, Missouri
82389	Switchcraft Inc. Chicago, Illinois	90211	Square D Co. Chicago, Illinois
82415	Price Electric Corp. Frederick, Maryland	90303	Mallory Battery Co. Tarrytown, New York
82872	Roanwell Corp. New York, New York	91293	Johanson Mfg. Co. Boonton, New Jersey
82877	Rotron Mfg. Co., Inc. Woodstock, New York	91407	Replaced by 58474
82879	ITT Wire & Cable Div. Pawtucket, Rhode Island	91502	Associated Machine Santa Clara, California
83003	Varo Inc. Garland, Texas	91506	Augat Attleboro, Massachusetts
83298	Bendix Corp. Electric Power Division Eatontown, New Jersey	91637	Dale Electronics Inc. Columbus, Nebraska
83330	Smith, Herman H., Inc. Brooklyn, New York	91662	Elco Corp. Willow Grove, Pennsylvania
83478	Rubbercraft Corp. of America New Haven, Connecticut	91737	Gremar Mfg. Co., Inc. (ITT) Woburn, Massachusetts
83594	Burroughs Corp. Electronic Components Div. Plainfield, New Jersey	91802	Industrial Devices, Inc. Edgewater, New Jersey
83740	Union Carbide Corp. Consumer Products Div. New York, New York	91833	Keystone Electronics Corp. New York, New York
84171	Arco Electronics, Inc. Great Neck, New York	91836	King's Electronics Tuckahoe, New York
84411	TRW Ogallala, Nebraska	91929	Honeywell Inc. Micro Switch Div. Freeport, Illinois
84613	Fuse Indicator Corp. Rockville, Maryland	91934	Miller Electric Co., Inc. Pawtucket, Rhode Island
86577	Precision Metal Products Stoneham, Massachusetts	93332	Sylvania Electric Products Semiconductor Products Div. Woburn, Massachusetts
86684	Radio Corp. of America Electronic Components & Devices Harrison, New Jersey	94145	Replaced by 49956
86689	Deleted	94154	Tung-Sol Div. of Wagner Electric Corp. Newark, New Jersey
87034	Marco - Oak Inc. Anaheim, California	95146	Alco Electronics Products Inc. Lawrence, Massachusetts
		95263	Leecraft Mfg. Co. Long Island City, New York
		95264	Replaced by 98278

Table 7-2. FEDERAL SUPPLY CODES FOR MANUFACTURERS (Continued)

95275	Vitramon Inc. Bridgeport, Connecticut	98278	Microdot Inc. Pasadena, California
95303	Radio Corp. of America Solid State & Receiving Tube Div. Cincinnati, Ohio	98291	Seaelectro Corp. Conhex Div. Mamaroneck, New York
95354	Method Mfg. Corp. Rolling Meadows, Illinois	98388	Accurate Rubber & Plastics Culver City, California
95712	Dage Electric Co., Inc. Franklin, Indiana	98743	Replaced by 12749
95987	Weckesser Co. Inc. Chicago, Illinois	98925	Deleted
96733	San Fernando Electric Mfg. Co. San Fernando, California	99120	Plastic Capacitors, Inc. Chicago, Illinois
96853	Rustrak Instrument Co. Manchester, New Hampshire	99217	Southern Electronics Corp. Burbank, California
96881	Thomson Industries, Inc. Manhasset, New York	99392	STM Oakland, California
97540	Master Mobile Mounts Div. of Whitehall Electronics Corp. Los Angeles, California	99515	Marshall Industries Capacitor Div. Monrovia, California
97913	Industrial Electronic Hdware Corp. New York, New York	99779	Barnes Corp. Lansdowne, Pennsylvania
97945	White, S.S. Co. Plastics Div. New York, New York	99800	American Precision Industries Inc. Delevan Division East Aurora, New York
97966	Replaced by 11358		Toyo Electronics (R-Ohm Corp.) Irvine, California
98094	Replaced by 49956		
98159	Rubber-Teck, Inc. Gardena, California		National Connector Minneapolis, Minnesota

Table 7-3. FLUKE TECHNICAL CENTERS

Fluke Western Technical Center
2020 North Lincoln St.
Burbank, CA 91504
Tel. 213-849-4641
TWX: 910-497-2086

Fluke Western Technical Center
2359 De La Cruz Blvd.
Santa Clara, CA 95050
Tel. 408-244-1505
TWX: 910-338-0121

Fluke S.W. Technical Center
Unit 4
1980 South Quebec Street
Denver, CO 80231
Tel. 303-750-1228
TWX: 910-320-2263

Fluke S.E. Technical Center
P.O. Box 6578
940 North Fern Creek Avenue
Orlando, FL 32803
Tel. 305-896-2296
TWX: 810-850-0185

Fluke Midwestern Technical Center
1287 North Rand Road
Des Plaines, IL 60016
Tel. 312-298-7470
TWX: 910-233-4978

Fluke Mideastern Technical Center
11501 Huff Court
Kensington, MD 20795
Tel. 301-881-5300
TWX: 710-825-9645

Fluke N.E. Technical Center
109 Massachusetts Ave.
Lexington, MA 02173
Tel. 617-861-8620
TWX: 710-826-1715

Fluke Midwestern Technical Center
10800 Lyndale Avenue South
Minneapolis, MN 55420
Tel. 612-884-4541
TWX: 910-576-3141

Fluke Eastern Technical Center
500 Union Blvd.
Totowa, NJ 07512
Tel. 201-742-3215
TWX: 710-988-5949

Fluke Eastern Technical Center
4515 Culver Road
Rochester, NY 14622
Tel. 716-342-6940
TWX: 510-253-6145

Fluke S.E. Technical Center
P.O. Box 9619
1310 Beaman Place
Greensboro, NC 27408
Tel. 919-273-1918
TWX: 510-925-1173

John Fluke Mfg. Co., Inc.
7001 - 220th S.W.
Mountlake Terrace, WA 98043
Tel. 206-774-2238
TWX: 910-449-2850

Fluke Canadian Technical Center
3829 - 12th St. N.E.
Calgary Alberta
Tel. 403-276-9658
TWX: 610-821-2233

Fluke Canadian Technical Center
6427 Northam Drive
Mississauga, Ontario
Tel. 416-678-1500
TWX: 610-492-2119

Table 7-4. SALES REPRESENTATIVES — DOMESTIC

ALABAMA**HUNTSVILLE**

BCS Associates, Inc.
3322 S. Memorial Parkway
P.O. Box 1273
Tel. (205) 881-6220
Zip 35801

ALASKA**ANCHORAGE**

Harry Lang & Associates
1406 W. 47th Ave.
Tel. (907) 279-5741
Zip 99503

ARIZONA**PHOENIX**

Barnhill Associates
7319 E. Stetson Dr.
Tel. (602) 947-7841
Scottsdale, AZ 85251

CALIFORNIA**LOS ANGELES**

Instrument Specialists, Inc.
2020 N. Lincoln Street
Burbank, CA 91504
Tel. (213) 849-7181

NEWPORT BEACH

Instrument Specialists, Inc.
4120 Birch Street
Suite 119
Tel. (714) 752-6200
Zip 92660

SANTA CLARA

Instruments Specialists, Inc.
2359 De La Cruz Blvd.
Tel. (408) 244-1505
Zip 95050

SAN DIEGO

Instrument Specialists, Inc.
4805 Mercury St., Ste. 1
Tel. (714) 565-2555
Zip 92111

COLORADO**DENVER**

Barnhill Associates, Inc.
1980 South Quebec St.
Tel. (303) 750-1228
Zip 80231

CONNECTICUT**HARTFORD**

Instrument Representatives, Inc.
P.O. Box 165
Glastonbury, CT 06033
Tel. (203) 633-0777

FLORIDA**ORLANDO**

BCS Associates, Inc.
940 N. Fern Creek Ave.
Tel. (305) 896-4881
(305) 843-1510
Zip 32803

GEORGIA**DECATUR**

BCS Associates, Inc.
2522 Tanglewood Road
Tel. (404) 321-0980
Zip 30033

HAWAII**HONOLULU**

Industrial Electronics, Inc.
646 Queen Street
P.O. Box 135
Tel. (808) 533-6095
Zip 96817

ILLINOIS**CHICAGO**

Cozzens & Cudahy, Inc.
1301 N. Rand Road
Des Plaines, IL 60016
Tel. (312) 298-3600

INDIANA**INDIANAPOLIS**

Cozzens & Cudahy, Inc.
Port O'Call Executive Ctr.
21 Beachway Drive
Tel. (317) 244-2456
Zip 46244

KENTUCKY**VALLEY STATION**

BCS Associates, Inc.
4506 Freda Way
Tel. (502) 935-9634
Zip 40272

MARYLAND**BALTIMORE**

Electronic Marketing Assoc. Inc.
11501 Huff Court
Kensington, MD 20795
Tel. (301) 881-5300, 744-7700

MASSACHUSETTS**BOSTON**

Instrument Representatives, Inc.
109 Massachusetts Ave.
Lexington, MA 02173
Tel. (617) 861-8620

MICHIGAN**DETROIT**

WKM Associates, Inc.
1474 East Outer Dr.
Tel. (313) 892-2500
Zip 48234

MINNESOTA**MINNEAPOLIS**

Cozzens & Cudahy, Inc.
10800 Lyndale Ave. S.
Tel. (612) 884-4336
Zip 55420

MISSOURI**KANSAS CITY**

Cozzens & Cudahy, Inc.
4404 Chouteau Traffic Way
Tel. (816) 454-5836
Zip 64117

ST. LOUIS

Cozzens & Cudahy Inc.
P.O. Box 10013
Lambert Field - Zip 63145
Tel. (314) 423-1234

NEW JERSEY**NEWARK**

SBM Representatives
1519 Stuyvesant Avenue
Union, NJ 07083
Tel. (201) 687-8737

NEW MEXICO**ALBUQUERQUE**

Barnhill Associates
1410 - D Wyoming N.E.
Tel. (505) 299-7658
Zip 87112

NEW YORK**NEW YORK**

SBM Representatives
28 Hobby Street
Pleasantville, NY 10570
Tel. (914) 769-1811

ROCHESTER

SBM Representatives
4515 Culver Road
Tel. (716) 226-1400
Zip 14622

NORTH CAROLINA**GREENSBORO**

BCS Associates, Inc.
P.O. Box 9619
1310 Beaman Place
Tel. (919) 273-1918
Zip 27408

OHIO**CLEVELAND**

WKM Associates, Inc.
16141 Puritas Ave.
Tel. (216) 267-0445
Zip 44135

DAYTON

WKM Associates, Inc.
6073 Far Hills Ave.
Tel. (513) 434-7500
Zip 45459

OREGON**BEAVERTON**

Showalter Instruments, Inc.
13485 S.W. Hargis Road
Tel. (503) 646-3004
Zip 97005

PENNSYLVANIA**PHILADELPHIA**

Electronic Marketing Assoc.
210 Goddard Blvd., Ste. 100
King of Prussia, PA
Tel. (215) 248-5050
Zip 19406

PITTSBURGH

WKM Associates, Inc.
90 Clairton Blvd.
Tel. (412) 892-2953
Zip 15236

Table 7-4. SALES REPRESENTATIVES – DOMESTIC (Continued)

TEXAS

DALLAS

Barnhill Associates
908 Business Parkway
Richardson, TX 75080
Tel. (214) 231-2573

HOUSTON

Barnhill Associates
10606 Hempstead Hwy.
Suite 132
Tel. (713) 688-9971
Zip 77018

VIRGINIA

WILLIAMSBURG

BCS Associates
107 Rich Neck Road
Tel. (703) 229-5108
Zip 23185

WASHINGTON

SEATTLE

Showalter Instruments, Inc.
1521 - 130 N.E.
Bellevue, WA 98005
Tel. (206) 455-4922
(206) 624-4035

CANADA

BRITISH COLUMBIA

NORTH VANCOUVER

Allan Crawford Associates, Ltd.
234 Brooksbank Ave.
Tel. (604) 980-4831

ALBERTA

CALGARY

Allan Crawford Associates, Ltd.
3829 - 12th St. N.E.
Tel. (403) 276-9658

ONTARIO

MISSISSAUGA

Allan Crawford Associates, Ltd.
6427 Northam Drive
Tel. (416) 678-1500

OTTAWA, 3

Allan Crawford Associates, Ltd.
1299 Richmond Road
Tel. (613) 829-9651

QUEBEC

LONGUEUIL

Allan Crawford Associates, Ltd.
1330 Marie Victorin Blvd. East
Tel. (514) 670-1212

NOVA SCOTIA

DARTMOUTH

Allan Crawford Associates, Ltd.
St. 201, Townsend Pl.
800 Wind Mill Road
Burns Industrial Park
Dartmouth, N.S. B3B 1L1
Tel. (902) 469-7865

Table 7-5. SALES REPRESENTATIVES — INTERNATIONAL

Argentina Coasin S.A. Virrey del Pino 4071 Buenos Aires, Argentina Tel: 523185	Colombia Asistec Limitada Apartado Aereo 12322 Bogota 1, Colombia Tel: 419331	Greece Hellenic Scientific Representations Ltd. 10, Nympheou Street Athens 615 Greece Tel: 7792320/705960
Austria Kontron GmbH & Co. KG Ameisgasse 49 1140 - Vienna, Austria Tel: 09-43222945646	Cyprus Chris Radiovision Ltd. P.O. Box 1989 Nicosia, Cyprus Tel: 66121	Hong Kong & Macao Gilman & Co., Ltd. P.O. Box 56 Hong Kong Tel: 227011 (14)
Australia Elmeasco Instruments Pty Ltd. P.O. Box 334 Brookvale, N.S.W. Australia 2100 Tel: (02) 939-7944	Denmark Tage Olsen A/S Teglvaerksgade 37 DK-2100 Copenhagen O Denmark Tel: 01-294800	India Hinditron Services Pvt Ltd. 69/A. L. Jagmohandas Marg Bombay - 400 006, India Tel: 365344
Belgium C.N. Rood S.A. 37, Place de Jamblinne de Meux B-1040 Brussels, Belgium Tel: 02-27352135	Eastern Europe Countries Elpro GmbH Molkergasse 4 1080 - Vienna, Austria Tel: 222 424692	Indonesia P.T. United Dico-Citas Co., Ltd. JLN Penjaringan 39A Jakarta, Indonesia
Brazil Ambriex S.A. Rua Ceara, 104 - 2.º e 3.º Andares ZC-29 Rio de Janeiro GB, Brazil Tel: 264-7406 Ambriex S.A. Rua Tupi, 535 01233 Sao Paulo SP, Brazil Tel: 52-7806 & 0912	Ecuador Proteco Coasin CIA, Ltda. Apartado 228A Quito, Ecuador Tel: 526759	Iran Berkeh Company Ltd. 20 Salm Road, Roosevelt Ave. Tehran, Iran Tel: 828294 831564
Caribbean West Indies Sales Co., Ltd. 7360 N.W. 66th St. Miami, FL 33166 Tel: (305) 592-8188	Egypt Lotus Engineering Organisation P.O. Box 1252 Cairo, Egypt Tel: 71617	Israel R.D.T. Electronics Engineering Ltd. 46, Sokolov Street Ramat Hasharon 47235 Isreal Tel: 483211
Central America Intermetra Corp 11 Park Place, Suite 2003 New York, NY 10007 Tel: (212) 349-7630, 31, 32	Finland OY Findip AB Teollisuustie 7 02700 Kauniainen Finland Tel: 502255	Italy Sistrel S.p.A. Via Giorgio da Sebenico 11-13 00143 Roma, Italy Tel: 06-500-1860
Chile Coasin Chile Ltd. Casilla 14588 - Correo 15 Santiago, Chile Tel: 396713	France M.B. Electronique S.A. 29, Rue Emile Duclaux 92150, Suresnes France Tel: 7723111 (108)	Japan Toyo Trading Company, Ltd. P.O. Box 5014 International Tokyo Tokyo 100-31, Japan Tel: (03) 279-0771 Toyo Trading Company, Ltd. Suzuki Bldg. 2-38 Junkeicho-dori Minami-ku, Osaka Japan Tel: (06) 262-3471
China May Lee Industries, Inc. 111 Broadway, Suite 510 New York, NY 10006 Tel: (212) 349-5780	Germany Fluke (Deutschland) GmbH 4-Dusseldorf Meineckestrasse 53 West Germany Tel: 450831	Kenya Advanced Communications Ltd. City House, Wabera Street P.O. Box 30635 Nairobi, Kenya Tel: 31955

Table 7-5. SALES REPRESENTATIVES — INTERNATIONAL (Continued)

Korea

Asia Science & Co.
International P.O. Box 1250
Seoul, Korea
Tel: 76-2761

Kuwait

Tareq Company
P.O. Box Safat 20506
Kuwait, Arabian Gulf
Tel: 436100, 436045

Lebanon

General Marketing Trading &
Contracting Company
Anis Nsouli Street
Nsouli Building
P.O. Box 155.655
Beirut, Lebanon
Tel: 319383, 312061

Malaysia

O'Connor's (PTE) Limited
P.O. Box 91
Petaling Jaya, Selangor
West Malaysia
Tel: 51563

Mexico

Mexitek, S.A.
Eugenia 408
Department 1
Mexico 12, D.F.
Mexico
Tel: 5360910 - 5239751

Morocco

S.I.E.E.M.
Residence Moulay Ismail
Bat. C.
Boulevard Moulay Slimane
Rabat, Morocco
Tel: 276-64

Netherlands

C.N. Rood B.V.
13, Cort van der Lindenstraat
P.O. Box 42
Rijswijk ZH 2100
Netherlands
Tel: 070-996360

Fluke (Nederland) B.V.
P.O. Box 5053
Zevenheuvelenweg 53
Tilburg, Netherlands
Tel: (13) 673973

New Zealand

Elmeasco Instruments Pty Ltd.
P.O. Box 30515
LOWER HUTT
New Zealand
Tel: 697566

Nigeria

Deemtee Electrotechnics Ltd.
P.O. Box 3073
Lagos, Nigeria

Norway

Morgenstjerne & Co. A/S
Konghellegate 3
P.O. Box 6688, Rodelokka
Oslo 5, Norway
Tel: (02) 372940

Pakistan

Pak International Operations
505 Muhammadi House - McLeod Rd.
P.O. Box 5323
Karachi, Pakistan

Peru

Importaciones Y Representaciones
Electronicas S.A.
Avda. Franklin D. Roosevelt 105
Lima 1, Peru
Tel: 27-2078

Philippines

Brixton Trading Company, Inc.
Suite 636 Metropolitan Bank Build.
Ayala Avenue
Makati, Rizal D-708, Philippines
Tel: 88-27-06, 88-58-90

Portugal

Equipamentos De Laboratorio Lda.
P.O. Box 1100
Lisbon 1, Portugal
Tel: 976551

Singapore

O'Connor's (PTE) Limited
98 Pasir Panjang Road
Singapore 5, Singapore
Tel: 637944

South Africa

Elairco (Pty) Ltd.
P.O. Box 13091
Benoni 1511
Transvaal
Republic of South Africa
Tel: 54-5513 - 547571

Spain

Ataio Ingenieros S.A.
Enrique Larreta 12
Madrid 16, Spain
Tel: 7330562

Sweden

Teleinstrument AB
P.O. Box 490
Maltesholmvgen 490
S-162 04 Vallingby
Sweden
Tel: 08-380370

Switzerland

Kontron Electronic A.G.
Bernnerstrasse-Sud 169
8048 Zurich
Switzerland
Tel: 01-628282

Taiwan

Heighten Trading Company, Ltd.
P.O. Box 1408
Taipei, Taiwan 100
Republic of China
Tel: 5118324 - 5118372

Thailand

Dynamic Supply Engineering R.O.P.
No. 56 Ekamai, Sukhumvit 63
Bangkok 11, Thailand
Tel: 914434, 928532

Turkey

M. Suheyl Erkman
Necatibey Cad. 92/2
Karakoy/Istanbul
Turkey
Tel: 441546 - 447651

The United Kingdom

Fluke International Corporation
Garnet Close
Watford, WD2 4TT
England
Tel: 0923-33066

U.S.S.R.

Codevintec Pacific Inc.
6263 Variel
Woodland Hills, CA 91364
Tel: (213) 348-1719

Table 7-5. SALES REPRESENTATIVE - INTERNATIONAL (Continued)

Uruguay

Coasin Uruguay S.R.L.
Cerrito 617 - 4° Piso
Montevideo, Uruguay

Venezuela

Coasin C.A.
Apdo. Postal 50939
Sabana Grande No. 1
Caracas 105, Venezuela
Tel: 722311 - 728662

In Europe, contact FLUKE NEDERLAND, B.V., P.O. Box 5053, Industrieterrein Noord, Tilburg, The Netherlands

FLUKE REGIONAL SERVICE CENTER: THE NETHERLANDS

FLUKE (NEDERLAND) B.V.
P.O. BOX 5053
TILBURG, THE NETHERLANDS

FLUKE REGIONAL SERVICE CENTER, UNITED KINGDOM

FLUKE INTERNATIONAL CORP.
GARNETT CLOSE
WATFORD, WD24TT ENGLAND

AUTHORIZED SERVICE LABORATORIES INTERNATIONAL

EACH INTERNATIONAL REPRESENTATIVE IS EQUIPPED WITH AN AUTHORIZED SERVICE LABORATORY.
PLEASE REFER TO THE INTERNATIONAL REPRESENTATIVE LISTING FOR YOUR SERVICE NEEDS.

Table 7-5. SALES REPRESENTATIVE - INTERNATIONAL (Continued)

Uruguay

Coasin Uruguaya S.R.L.
Cerrito 617 - 4° Piso
Montevideo, Uruguay

Venezuela

Coasin C.A.
Apdo. Postal 50939
Sabana Grande No. 1
Caracas 105, Venezuela
Tel: 722311 - 728662

In Europe, contact FLUKE NEDERLAND, B.V., P.O. Box 5053, Industrieterrein Noord, Tilburg, The Netherlands

FLUKE REGIONAL SERVICE CENTER: THE NETHERLANDS

FLUKE (NEDERLAND) B.V.
P.O. BOX 5053
TILBURG, THE NETHERLANDS

FLUKE REGIONAL SERVICE CENTER, UNITED KINGDOM

FLUKE INTERNATIONAL CORP.
GARNETT CLOSE
WATFORD, WD24TT ENGLAND

AUTHORIZED SERVICE LABORATORIES INTERNATIONAL

EACH INTERNATIONAL REPRESENTATIVE IS EQUIPPED WITH AN AUTHORIZED SERVICE LABORATORY.
PLEASE REFER TO THE INTERNATIONAL REPRESENTATIVE LISTING FOR YOUR SERVICE NEEDS.

Section 8

Schematic Diagrams

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Attenuator PCB	6011A-1003
Main PCB	6011A-1004 (3 sheets)
Display Schematic	6011A-1005 (2 sheets)
Phase Lock Input	6010A-1006
Schematic Diagram, FM Oscillator	6010A-1007
IEC—ASCII Bus Interface	6010A-1008
Amplitude D/A	6011A-1009
RS232-C Interface	6010A-1010

8

7

6

5

A & B DECADES
HI RANGE 10Hz & 100Hz STEPS OR
LO RANGE 0.1Hz & 1Hz STEPS

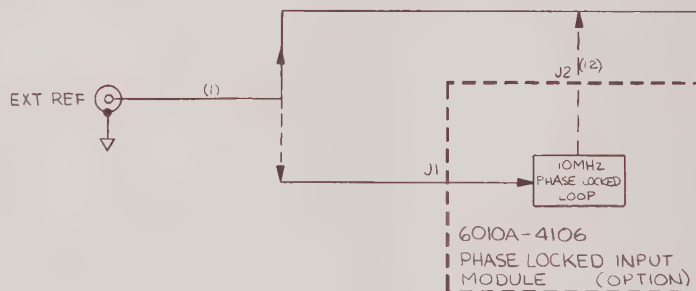
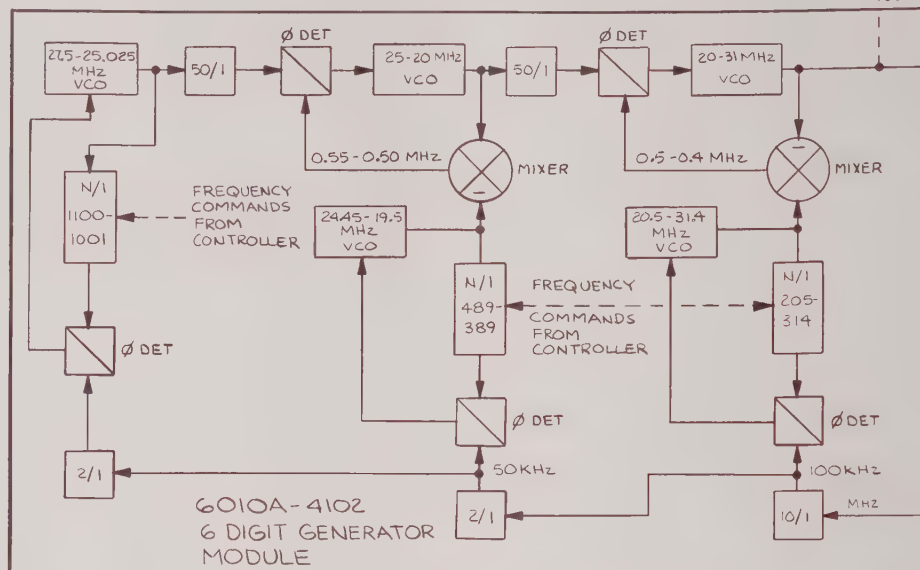
C & D DECADES
1KHz & 10KHz STEPS OR
10Hz & 100Hz STEPS

E & F DECADES
100KHz & 1MHz STEPS OR
1KHz & 10KHz STEPS

OPTION
20-31MHz
OUTPUT

D

C



B

AM IN

(9)

J2

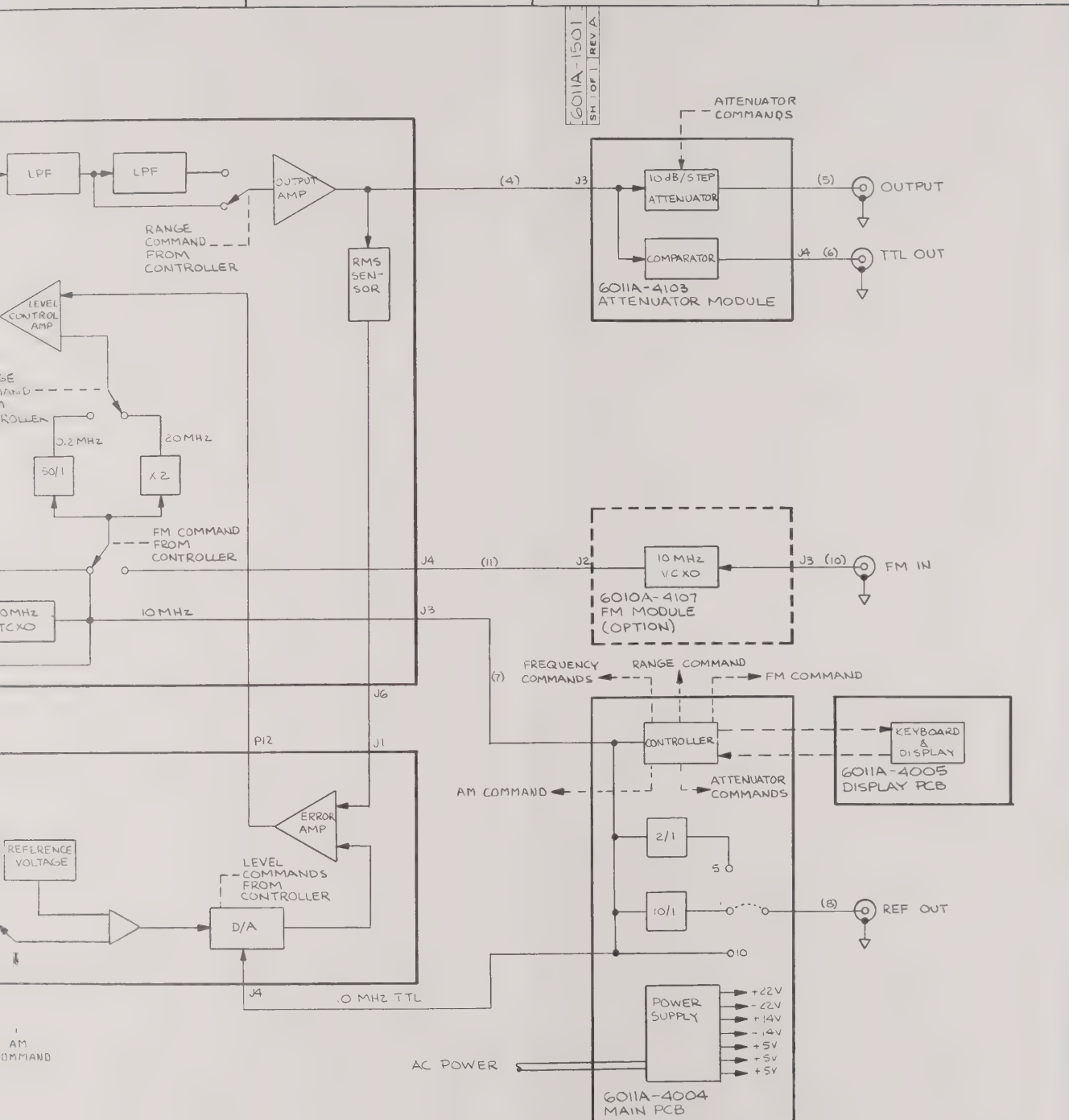
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4

3

2

1



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FLUKE

89536

KA 1.020
XXX 1.010
ANALYSIS
AC

JOHN FLUKE MFG. CO., INC.

P.O. BOX 7428 SEATTLE WA

DO NOT SCALE DRAWING
DIMENSIONS IN INCHES

DR. R. MESSERSMITH

CHK

ENG
ENG
MATERIAL
FINISH

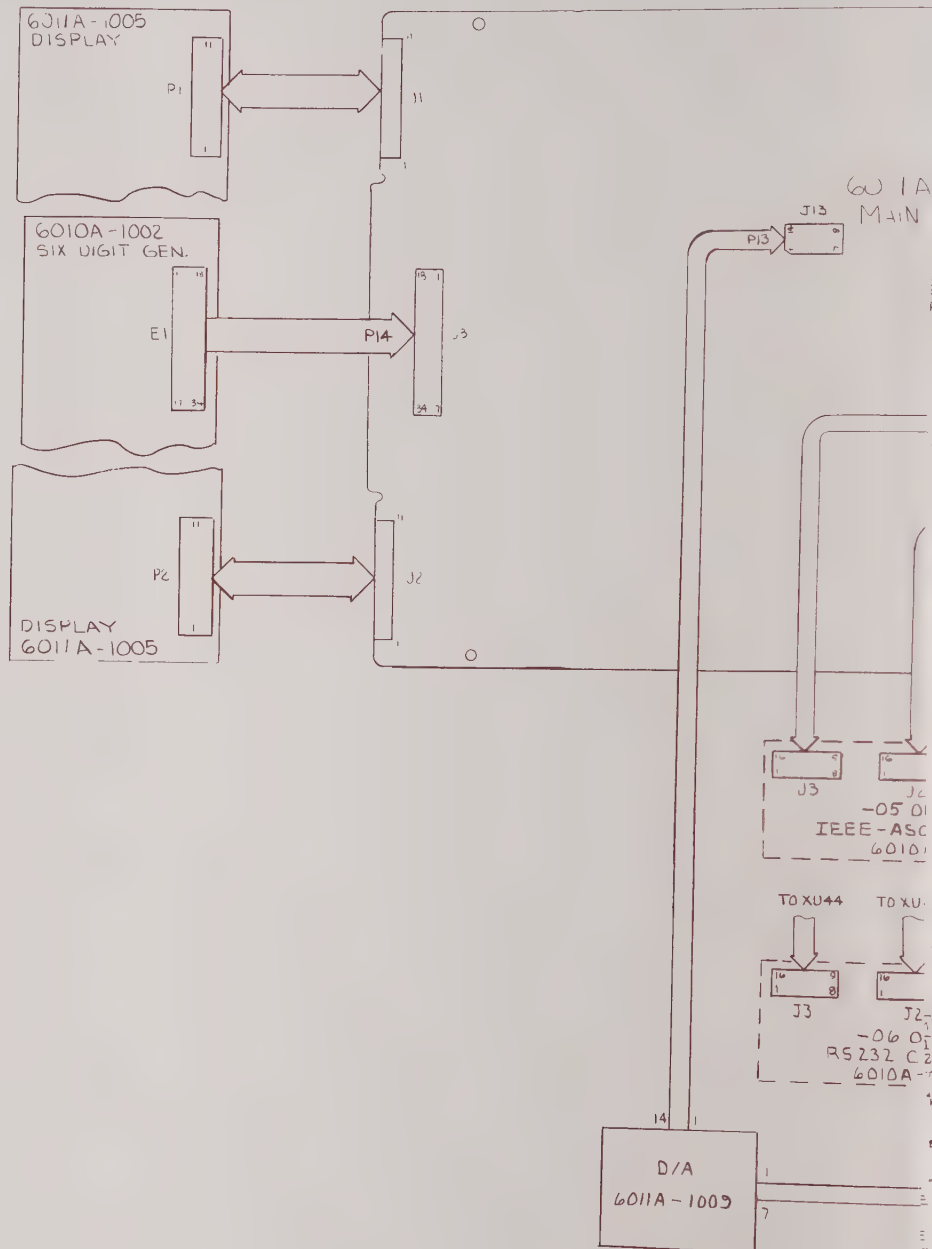
A		REVISED 10-6-75		ESR
NO.	CHANGE DESCRIPTION	DR	CHK	DATE
SYSTEM BLOCK DIAGRAM				
PART NO.	SIZE	DRAWING NO.		
	D	6011A-1501		
SCALE	SHT	1 OF 1	REV	A

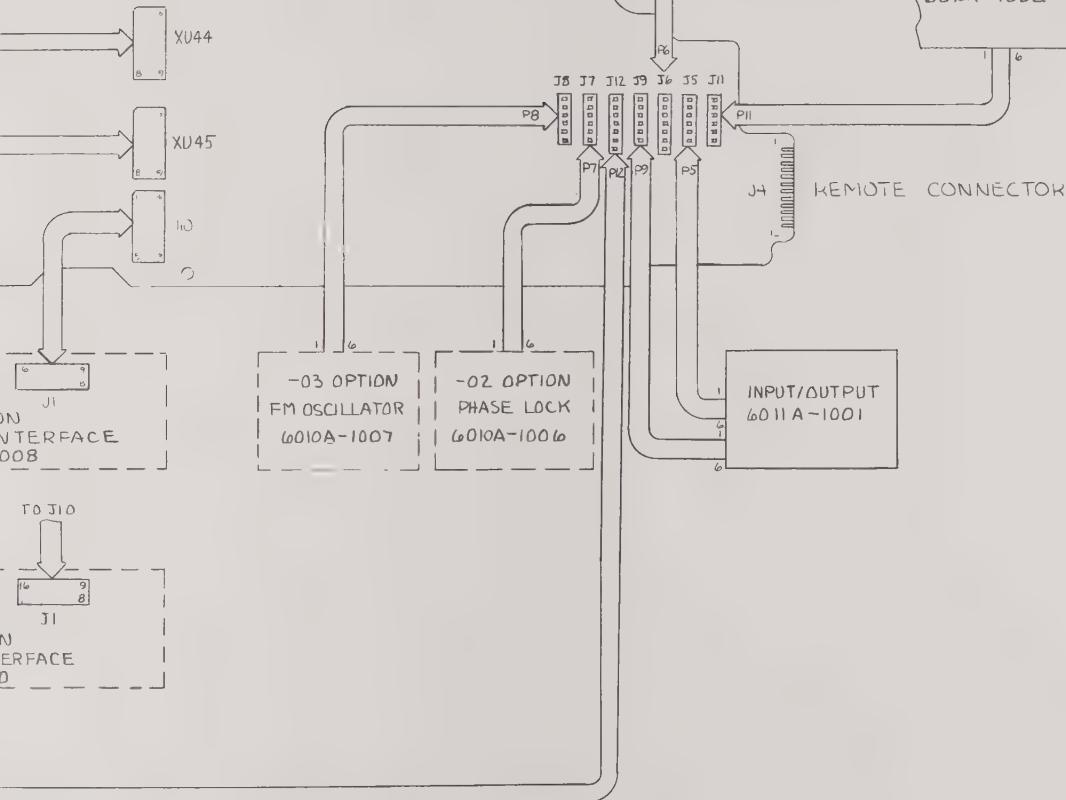
D

C

B

A



004
KU6011A-1502
SH 1 of 3 REV C

C	REVISED TO MATCH SCHEMATICS OF RELATED BOARDS. ADDED SHTS	ESH	
A	REVISED 6-11-75	ESH	
HANDLE WITH CARE			
INTERCONNECT DIAGRAM			
D			
3			

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FLUKE JOHN FLUKE MFG CO. INC.
P.O. BOX 7428 SEATTLE WA
89536

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DIMENSIONS IN INCHES

TOLERANCES

XXX-020	XXX-020	XXX-020	XXX-020
XXX-020	XXX-020	XXX-020	XXX-020
XXX-020	XXX-020	XXX-020	XXX-020

DATE: 6-11-75
BY: ESH
CHK: ESH
ENG: ESH
FIN: ESH
MATERIAL: ESH
FINISH: ESH

FUNCTION TABLE

CONNECTOR	PIN NO.	FUNCTION
6011A-1005-P1	1	DT5
	2	DT6
	3	DT3
	4	DEC2
	5	DEC0
	6	DIG1
	7	FREQ. D.P.
	8	GND
	9	+5V ₍₁₎
	10	FD2
	11	FD8
	12	DT2
	13	DT7
	14	DT1
	15	DT4
	16	DEC1
	17	DIG2
	18	DIG0
	19	BLANK FREQ.
	20	+5V ₍₁₎
	21	FD4
	22	FD1
6011A-1005-P2	1	LD1
	2	LD2
	3	LD4
	4	LD8
	5	ROL
	6	DT8
	7	*
	8	REM
	9	KD3
	10	FM CONTROL
	11	KD2
	12	BLANK LEVEL
	13	+5V ₍₁₎
	14	LEVEL D.P.
	15	SPARE
	16	GND
	17	AD3
	18	AD0
	19	AD2
	20	AD1
	21	KD1
	22	KD0
6010A-1002-P14 (E1)	1	OVERRANGE
	2	OVERRANGE
	3	*
	4	*
	5	'4' b DECADE CONTROL INPUT
	6	'1' b DECADE CONTROL INPUT
	7	*
	8	'8' f DECADE CONTROL INPUT
	9	'2' b DECADE CONTROL INPUT
	10	'8' b DECADE CONTROL INPUT
	11	'4' a DECADE CONTROL INPUT
	12	f DECADE OVERRANGE 'I'
	13	'1' a DECADE CONTROL INPUT
	14	'2' a DECADE CONTROL INPUT
	15	GND
	16	'8' a DECADE CONTROL INPUT
	17	'1' d DECADE CONTROL INPUT
	18	GND
	19	GND
	20	'4' d DECADE CONTROL INPUT
	21	'1' e DECADE CONTROL INPUT
	22	'8' e DECADE CONTROL INPUT
	23	'8' d DECADE CONTROL INPUT
	24	'2' d DECADE CONTROL INPUT
	25	'4' e DECADE CONTROL INPUT
	26	'2' e DECADE CONTROL INPUT
	27	'4' c DECADE CONTROL INPUT
	28	'1' c DECADE CONTROL INPUT
	29	'8' c DECADE CONTROL INPUT
	30	'2' c DECADE CONTROL INPUT
	31	'4' f DECADE CONTROL INPUT
	32	'2' f DECADE CONTROL INPUT
	33	'1' f DECADE CONTROL INPUT
	34	'8' f DECADE CONTROL INPUT
6010A-1002-P11	1	+14V (BRN)
	2	KEY
	3	-14V (RED)
	4	+5V ₍₃₎ (ORN)
	5	*
	6	*
6011A-1001-P9	1	ANALOG GND (BRN)
	2	AM/LEVEL ANALOG (RED)
	3	ANALOG GND (ORN)
	4	RANGE CONTROL (YEL)
	5	KEY
	6	FM CONTROL (GRN)

FUNCTION TABLE

CONNECTOR	PIN NO.	FUNCTION
6011A-1001-P5	1	-14V (BRN)
	2	+14V (RED)
	3	KEY
	4	+22V (ORN)
	5	-22V (YEL)
	6	+5V ₍₂₎ (GRN)
6010A-1006-P7	1	+14V (BRN)
	2	KEY
	3	-14V (RED)
	4	+5V ₍₂₎ (ORN)
	5	*
	6	*
6011A-1003-P6	1	KEY
	2	10dB
	3	-14V (RED)
	4	+22V (ORN)
	5	+5V ₍₂₎ (YEL)
	6	20dB
6010A-1007-P8	1	+14V (BRN)
	2	-14V (RED)
	3	+5V ₍₂₎ (ORN)
	4	FM
	5	FM CONTROL (YEL)
	6	40dB
6010A-1008-J1 (-05 OPTION)	1	+14V (BRN)
	2	-14V (RED)
	3	+5V ₍₁₎ (ORN)
	4	+5V ₍₁₎ (YEL)
	5	P/FF
	6	CLK
6010A-1008-J2 (-05 OPTION)	1	*
	2	*
	3	*
	4	*
	5	*
	6	*
	7	*
	8	*
	9	GND (8)
	10	GND (10)
	11	GND (10)
	12	GND (9)
	13	GND (7)
	14	GND (6)
	15	*
	16	REN
6010A-1008-J3 (-05 OPTION)	1	DRY
	2	BSY
	3	*
	4	REM
	5	*
	6	*
	7	+5V
	8	*
	9	*
	10	EOI
	11	ATN
	12	SRQ
	13	IFC
	14	VAC
	15	REF
	16	DAV
6011A-1004-J1	1	ADB1
	2	ADB2
	3	ADB3
	4	ADB4
	5	ADB5
	6	ADB6
	7	ADB7
	8	ADB8
	9	DIO8
	10	DIO7
	11	DIO6
	12	DIO5
	13	DIO4
	14	DIO3
	15	DIO2
	16	DIO1
6011A-1004-J2	1	DT3
	2	DT0
	3	DT5
	4	DEC1
	5	DEC0
	6	DIG1
	7	FREQ. D.P.
	8	GND
	9	+5V ₍₁₎
	10	FD2
	11	FD8
	12	DT2
	13	DT7
	14	DT1
	15	DT4
	16	DEC1
6011A-1004-J3	1	DIG2
	2	DIG0
	3	BLANK FREQ.
	4	+5V ₍₁₎
	5	FD4
	6	FD1

FUNCTION TABLE

CONNECTOR	PIN NO.	FUNCTION
6011A-1004-J2	1	LD1
	2	LD2
	3	LD4
	4	LD8
	5	ROL
	6	DT8
	7	*
	8	REM
	9	KD3
	10	FM CONTROL
	11	KD2
	12	BLANK LEVEL
	13	+5V ₍₁₎
	14	LEVEL D.P.
	15	SPARE
	16	GND
	17	AD3
	18	AD0
	19	AD2
	20	AD1
	21	KD1
	22	KD0
6011A-1004-J3	1	OVERRANGE
	2	OVERRANGE
	3	*
	4	*
	5	'4' b DECADE CONTROL INPUT
	6	'1' b DECADE CONTROL INPUT
	7	*
	8	'8' f DECADE CONTROL INPUT
	9	'2' b DECADE CONTROL INPUT
	10	'8' b DECADE CONTROL INPUT
	11	'4' a DECADE CONTROL INPUT
	12	f DECADE OVERRANGE 'I'
	13	'1' a DECADE CONTROL INPUT
	14	'2' a DECADE CONTROL INPUT
	15	GND
	16	'8' a DECADE CONTROL INPUT
	17	'1' d DECADE CONTROL INPUT
	18	GND
	19	GND
	20	'4' d DECADE CONTROL INPUT
	21	'1' e DECADE CONTROL INPUT
	22	'8' e DECADE CONTROL INPUT
	23	'8' d DECADE CONTROL INPUT
	24	'2' d DECADE CONTROL INPUT
	25	'4' e DECADE CONTROL INPUT
	26	'2' e DECADE CONTROL INPUT
	27	'4' c DECADE CONTROL INPUT
	28	'1' c DECADE CONTROL INPUT
	29	'8' c DECADE CONTROL INPUT
	30	'2' c DECADE CONTROL INPUT
	31	'4' f DECADE CONTROL INPUT
	32	'2' f DECADE CONTROL INPUT
	33	'1' f DECADE CONTROL INPUT
	34	'8' f DECADE CONTROL INPUT
6011A-1004-J4 (REMOTE CONN)	1	ADB1
	2	ADB2
	3	ADB3
	4	ADB4
	5	ADB5
	6	ADB6
	7	ADB7
	8	ADB8
	9	DIO8
	10	DIO7
	11	DIO6
	12	DIO5
	13	DIO4
	14	DIO3
	15	DIO2
	16	DIO1
	17	SPARE
	18	SPARE
	19	F/FF
	20	SPARE
	21	SPARE
	22	SPARE
	23	SPARE
	24	GND
6011A-1004-J5	1	-14V
	2	+14V
	3	KEY
	4	+22V
	5	-22V
	6	+5V ₍₂₎
6011A-1004-J6	1	KEY
	2	10dB
	3	-14V
	4	+22V
	5	+5V ₍₂₎
	6	20dB
6011A-1004-J7	1	40dB
	2	40dB

FUNCTION

LEVEL
DISPLAY
DATA

LEVEL

NOT USED ON 6011A

DE CONTROL
AVE CONTROL

DE CONTROL
DE CONTROL
DE CONTROL
DE CONTROL
OVERWANGE
DE CONTROL
DE CONTROL

DE CONTROL
DE CONTROL

DE CONTROL
DE CONTROL
DE CONTROL
DE CONTROL
DE CONTROL
DE CONTROL
DE CONTROL
DE CONTROL
DE CONTROL
DE CONTROL

OS OPTION
-06 OPTION

DIO1 *
DIO2 *
DIO3 *
DIO4 *
EOI GND
DAV SDI
RFD SDO
DAC *
IFC REM
SRQ *
ATN GND
SHIELD *
DIO5 *
DIO6 *
DIO7 *
DIO8 *
REN *
GND (6) *
GND (7) F/FF
GND (8) *
GND (9) *
GND (10) *
GND (11) *

FUNCTION TABLE				
CONNECTOR	PIN NO	FUNCTION		
6011A-1004-J7	1	+14V		
	2	KEY		
	3	-14V		
	4	+5V(2)		
	5	*		
	6	*		
6011A-1004-J8	1	+14V		
	2	-14V		
	3	+5V(3)		
	4	FM		
	5	FM CONTROL		
	6	KEY		
6011A-1004-J9	1	ANALOG GND		
	2	AM/LEVEL ANALOG		
	3	ANALOG GND		
	4	RANGE CONTROL		
	5	KEY		
	6	FM CONTROL		
6011A-1004-J10		STANDARD	-05 OPTION	-06 OPTION
	1	+5V(1)	+5V(1)	+5V(1)
	2	+5V(1)	+5V(1)	+5V(1)
	3	+5V(1)	+5V(1)	+5V(1)
	4	F/FF	F/FF	F/FF
	5	1MHz	CLK	*
	6	DO1	*	DO1
	7	DO8	*	DO8
	8	DAS	*	DAS
	9	SPARE	GND(8)	*
	10	SPARE	GND(11)	*
	11	SPARE	GND(10)	*
	12	SPARE	GND(9)	*
	13	F/FF	GND(7)	F/FF
	14	SPARE	GND(6)	*
	15	SPARE	*	*
	16	SPARE	REN	*
6011A-1004-XU44		STANDARD	-05 OPTION	-06 OPTION
	1	ADB1	ADB1	ADB1
	2	ADB2	ADB2	ADB2
	3	ADB3	ADB3	ADB3
	4	ADB4	ADB4	ADB4
	5	ADB5	ADB5	ADB5
	6	ADB6	ADB6	ADB6
	7	ADB7	ADB7	ADB7
	8	ADB8	ADB8	ADB8
	9	ADB8	DIO8	*
	10	ADB7	DIO7	*
	11	ADB6	DIO6	*
	12	ADB5	DIO5	*
	13	ADB4	DIO4	*
	14	ADB3	DIO3	*
	15	ADB2	DIO2	*
	16	ADB1	DIO1	*
6011A-1004-XU45		STANDARD	-05 OPTION	-06 OPTION
	1	DRY	DRY	DRY
	2	BSY	BSY	BSY
	3	PRD	*	PRD
	4	REM	REM	REM
	5	SPARE	*	*
	6	ROL	*	ROL
	7	+5V(1)	+5V(1)	+5V(1)
	8	GND	*	*
	9	GND	*	*
	10	+5V(1)	EOI	GND
	11	ROL	ATN	GND
	12	SPARE	SRQ	*
	13	REM	IFC	REM
	14	PRD	DAC	*
	15	BSY	RFD	SDO
	16	DRY	DAV	SDI
6011A-1004-J11	1	+14V		
	2	KEY		
	3	-14V		
	4	+5V(3)		
	5	*		
	6	*		
6011A-1004-J12	1	+5V(2)		
	2	KEY		
	3	-14V		
	4	+14V		
	5	ANALOG GND		
	6	AM/LEVEL ANALOG		
	7	ANALOG GND		

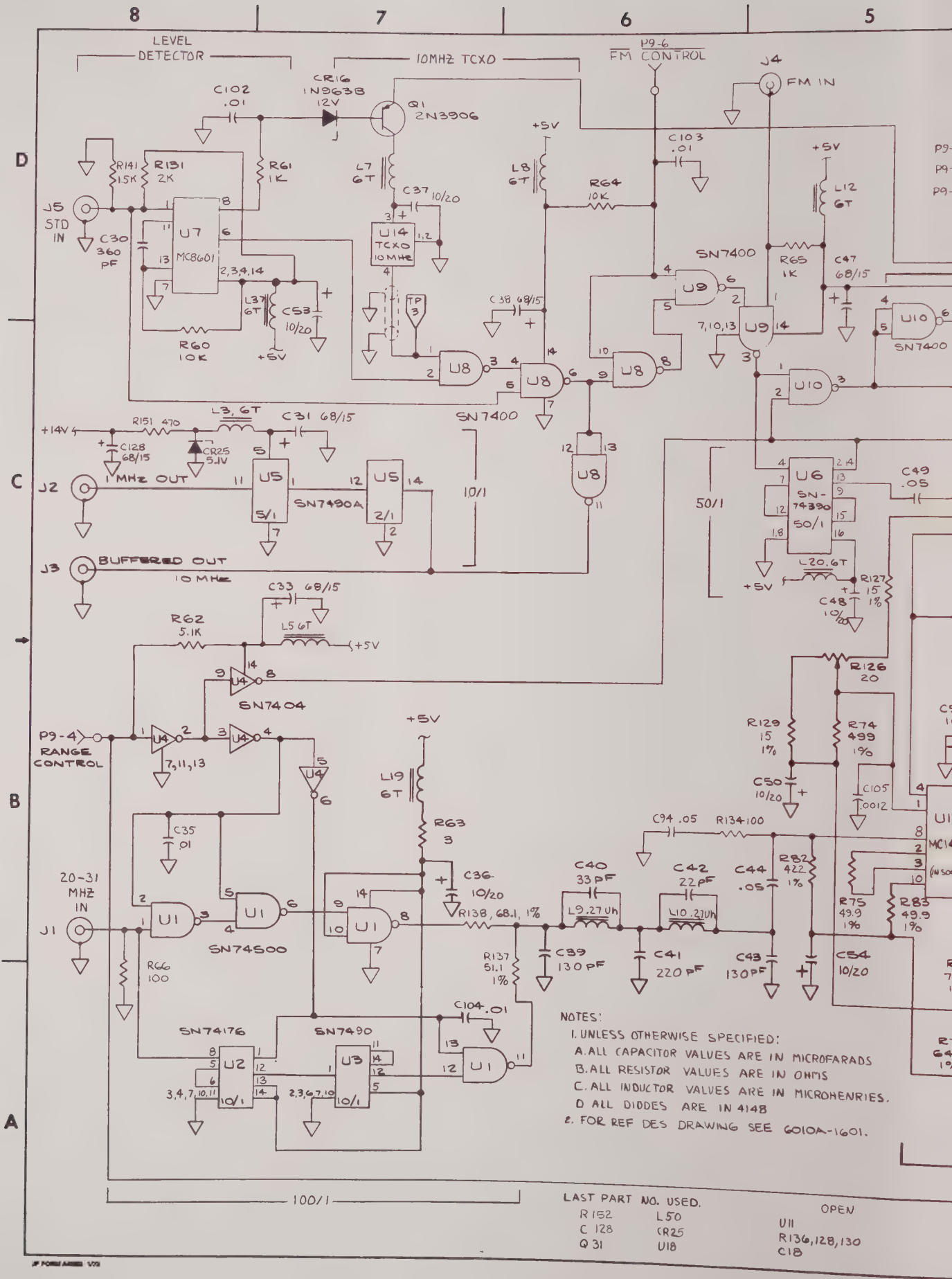
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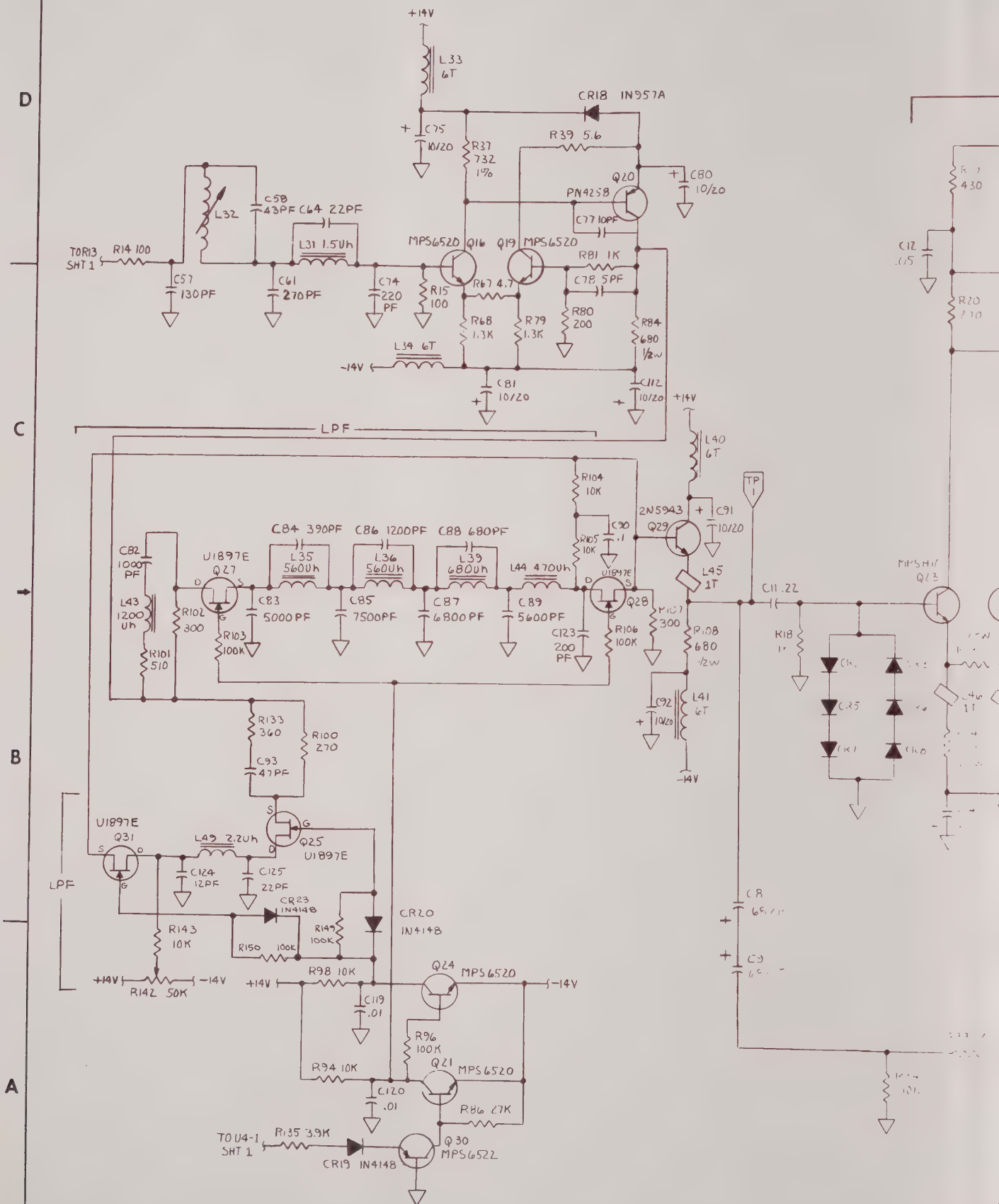
▷ FIXED / FREE FORMAT

2. NO CONNECTION *

SEE SHT 1 FOR REV. INFO.

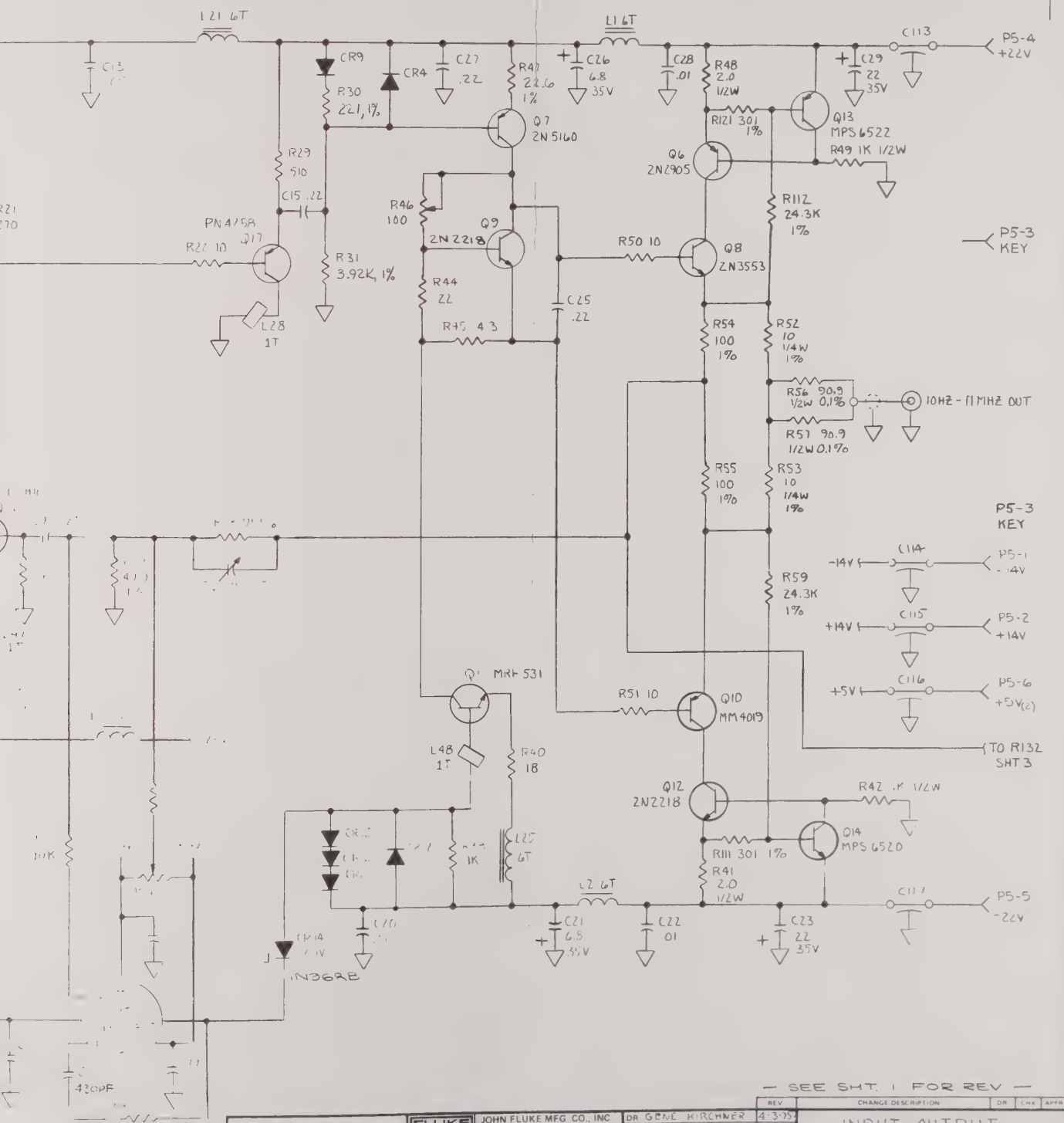
FLUKE JOHN FLUKE MFG CO INC P.O. BOX 1428 SEATTLE WA 98111-1428 89536 TOLERANCES .000 100 DIA .001 200 DIA .002 300 DIA .003 400 DIA .004 500 DIA .005 600 DIA .006 700 DIA .007 800 DIA .008 900 DIA .009 1000 DIA .010 1100 DIA .011 1200 DIA .012 1300 DIA .013 1400 DIA .014 1500 DIA .015 1600 DIA .016 1700 DIA .017 1800 DIA .018 1900 DIA .019 2000 DIA .020 2100 DIA .021 2200 DIA .022 2300 DIA .023 2400 DIA .024 2500 DIA .025 2600 DIA .026 2700 DIA .027 2800 DIA .028 2900 DIA .029 3000 DIA .030 3100 DIA .031 3200 DIA .032 3300 DIA .033 3400 DIA .034 3500 DIA .035 3600 DIA .036 3700 DIA .037 3800 DIA .038 3900 DIA .039 4000 DIA .040 4100 DIA .041 4200 DIA .042 4300 DIA .043 4400 DIA .044 4500 DIA .045 4600 DIA .046 4700 DIA .047 4800 DIA .048 4900 DIA .049 5000 DIA .050 5100 DIA .051 5200 DIA .052 5300 DIA .053 5400 DIA .054 5500 DIA .055 5600 DIA .056 5700 DIA .057 5800 DIA .058 5900 DIA .059 6000 DIA .060 6100 DIA .061 6200 DIA .062 6300 DIA .063 6400 DIA .064 6500 DIA .065 6600 DIA .066 6700 DIA .067 6800 DIA .068 6900 DIA .069 7000 DIA .070 7100 DIA .071 7200 DIA .072 7300 DIA .073 7400 DIA .074 7500 DIA .075 7600 DIA .076 7700 DIA .077 7800 DIA .078 7900 DIA .079 8000 DIA .080 8100 DIA .081 8200 DIA .082 8300 DIA .083 8400 DIA .084 8500 DIA .085 8600 DIA .086 8700 DIA .087 8800 DIA .088 8900 DIA .089 9000 DIA .090 9100 DIA .091 9200 DIA .092 9300 DIA .093 9400 DIA .094 9500 DIA .095 9600 DIA .096 9700 DIA .097 9800 DIA .098 9900 DIA .100 10000 DIA .101 10100 DIA .102 10200 DIA .103 10300 DIA .104 10400 DIA .105 10500 DIA .106 10600 DIA .107 10700 DIA .108 10800 DIA .109 10900 DIA .110 11000 DIA .111 11100 DIA .112 11200 DIA .113 11300 DIA .114 11400 DIA .115 11500 DIA .116 11600 DIA .117 11700 DIA .118 11800 DIA .119 11900 DIA .120 12000 DIA .121 12100 DIA .122 12200 DIA .123 12300 DIA .124 12400 DIA .125 12500 DIA .126 12600 DIA .127 12700 DIA .128 12800 DIA .129 12900 DIA .130 13000 DIA .131 13100 DIA .132 13200 DIA .133 13300 DIA .134 13400 DIA .135 13500 DIA .136 13600 DIA .137 13700 DIA .138 13800 DIA .139 13900 DIA .140 14000 DIA .141 14100 DIA .142 14200 DIA .143 14300 DIA .144 14400 DIA .145 14500 DIA .146 14600 DIA .147 14700 DIA .148 14800 DIA .149 14900 DIA .150 15000 DIA .151 15100 DIA .152 15200 DIA .153 15300 DIA .154 15400 DIA .155 15500 DIA .156 15600 DIA .157 15700 DIA .158 15800 DIA .159 15900 DIA .160 16000 DIA .161 16100 DIA .162 16200 DIA .163 16300 DIA .164 16400 DIA .165 16500 DIA .166 16600 DIA .167 16700 DIA .168 16800 DIA .169 16900 DIA .170 17000 DIA .171 17100 DIA .172 17200 DIA .173 17300 DIA .174 17400 DIA .175 17500 DIA .176 17600 DIA .177 17700 DIA .178 17800 DIA .179 17900 DIA .180 18000 DIA .181 18100 DIA .182 18200 DIA .183 18300 DIA .184 18400 DIA .185 18500 DIA .186 18600 DIA .187 18700 DIA .188 18800 DIA .189 18900 DIA .190 19000 DIA .191 19100 DIA .192 19200 DIA .193 19300 DIA .194 19400 DIA .195 19500 DIA .196 19600 DIA .197 19700 DIA .198 19800 DIA .199 19900 DIA .200 20000 DIA .201 20100 DIA .202 20200 DIA .203 20300 DIA .204 20400 DIA .205 20500 DIA .206 20600 DIA .207 20700 DIA .208 20800 DIA .209 20900 DIA .210 21000 DIA .211 21100 DIA .212 21200 DIA .213 21300 DIA .214 21400 DIA .215 21500 DIA .216 21600 DIA .217 21700 DIA .218 21800 DIA .219 21900 DIA .220 22000 DIA .221 22100 DIA .222 22200 DIA .223 22300 DIA .224 22400 DIA .225 22500 DIA .226 22600 DIA .227 22700 DIA .228 22800 DIA .229 22900 DIA .230 23000 DIA .231 23100 DIA .232 23200 DIA .233 23300 DIA .234 23400 DIA .235 23500 DIA .236 23600 DIA .237 23700 DIA .238 23800 DIA .239 23900 DIA .240 24000 DIA .241 24100 DIA .242 24200 DIA .243 24300 DIA .244 24400 DIA .245 24500 DIA .246 24600 DIA .247 24700 DIA .248 24800 DIA .249 24900 DIA .250 25000 DIA .251 25100 DIA .252 25200 DIA .253 25300 DIA .254 25400 DIA .255 25500 DIA .256 25600 DIA .257 25700 DIA .258 25800 DIA .259 25900 DIA .260 26000 DIA .261 26100 DIA .262 26200 DIA .263 26300 DIA .264 26400 DIA .265 26500 DIA .266 26600 DIA .267 26700 DIA .268 26800 DIA .269 26900 DIA .270 27000 DIA .271 27100 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DIA .472 47200 DIA .473 47300 DIA .474 47400 DIA .475 47500 DIA .476 47600 DIA .477 47700 DIA .478 47800 DIA .479 47900 DIA .480 48000 DIA .481 48100 DIA .482 48200 DIA .483 48300 DIA .484 48400 DIA .485 48500 DIA .486 48600 DIA .487 48700 DIA .488 48800 DIA .489 48900 DIA .490 49000 DIA .491 49100 DIA .492 49200 DIA .493 49300 DIA .494 49400 DIA .495 49500 DIA .496 49600 DIA .497 49700 DIA .498 49800 DIA .499 49900 DIA .500 50000 DIA .501 50100 DIA .502 50200 DIA .503 50300 DIA .504 50400 DIA .505 50500 DIA .506 50600 DIA .507 50700 DIA .508 50800 DIA .509 50900 DIA .510 51000 DIA .511 51100 DIA .512 51200 DIA .513 51300 DIA .514 51400 DIA .515 51500 DIA .516 51600 DIA .517 51700 DIA .518 51800 DIA .519 51900 DIA .520 52000 DIA .521 52100 DIA .522 52200 DIA .523 52300 DIA .524 52400 DIA .525 52500 DIA .526 52600 DIA .527 52700 DIA .528 52800 DIA .529 52900 DIA .530 53000 DIA .531 53100 DIA .532 53200 DIA .533 53300 DIA .534 53400 DIA .535 53500 DIA .536 53600 DIA .537 53700 DIA .538 53800 DIA .539 53900 DIA .540 54000 DIA .541 54100 DIA .542 54200 DIA .543 54300 DIA .544 54400 DIA .545 54500 DIA .546 54600 DIA .547 54700 DIA .548 54800 DIA .549 54900 DIA .550 55000 DIA .551 55100 DIA .552 55200 DIA .553 55300 DIA 	
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6011A-1001
SZ OF 3 REV E

OUTPUT AMPLIFIER



— SEE SHT. 1 FOR REV —

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FLUKE

89536

TOLERANCES

RESISTORS

CAPACITORS

ANGLES

JOHN FLUKE MFG. CO., INC.

P.O. BOX 7428, SEATTLE, WA

DO NOT SCALE DRAWING

DIMENSIONS IN INCHES

TOLERANCES

RESISTORS

CAPACITORS

ANGLES

DR. GENE KIRCHNER

CHK

ENG

ENG

MATERIAL

FINISH

INPUT OUTPUT
SCHEMATIC

PART NO. SIZE DRAWING NO.

D 6011A-1001

SCALE SHT 1 OF 3

REV

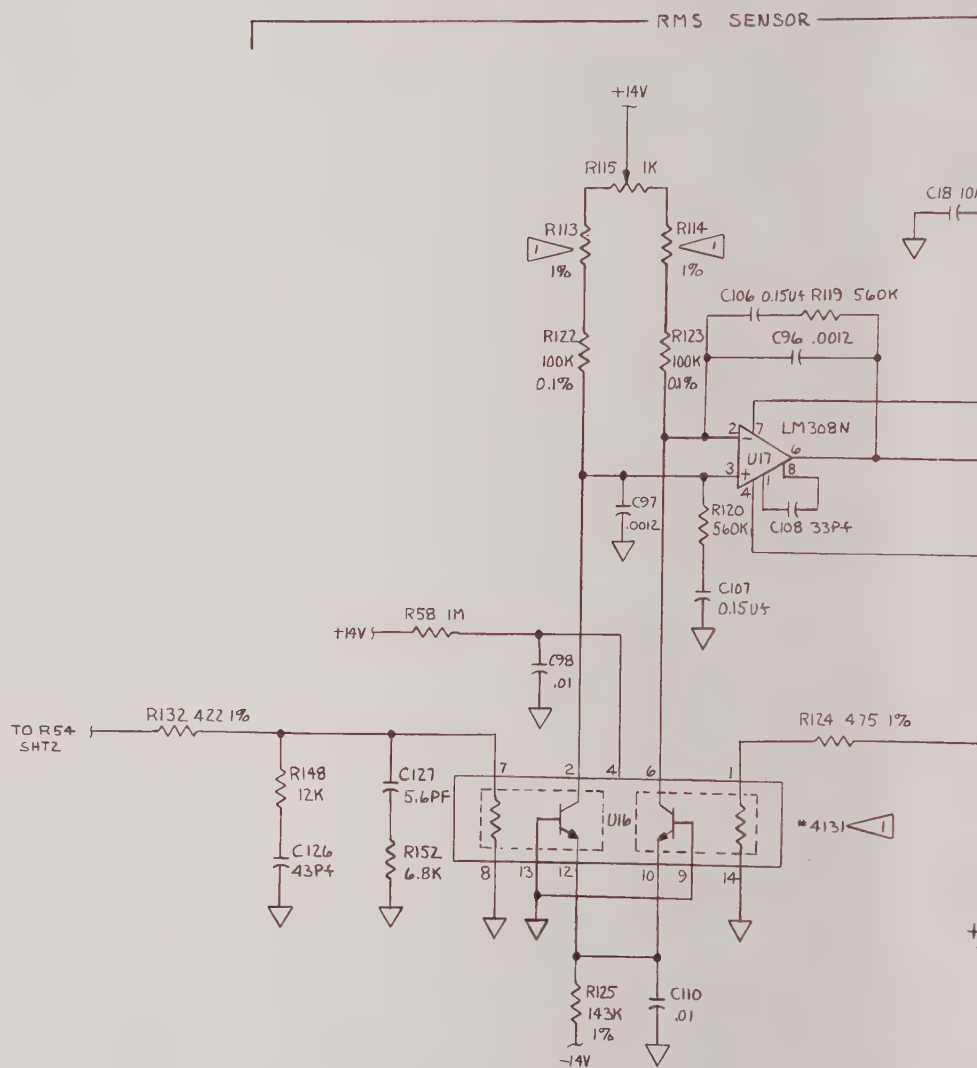
REV

D

C

B

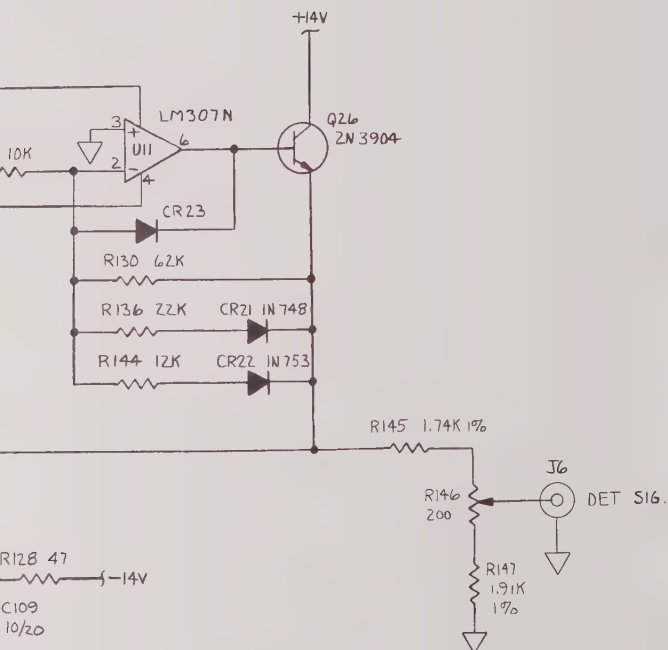
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1 MATCHED SET 6011A-4501
U16 = 4131 RMS CONV.
U113 AND R114 MF1%

6011A-1001
SH 3 OF 3 REV F

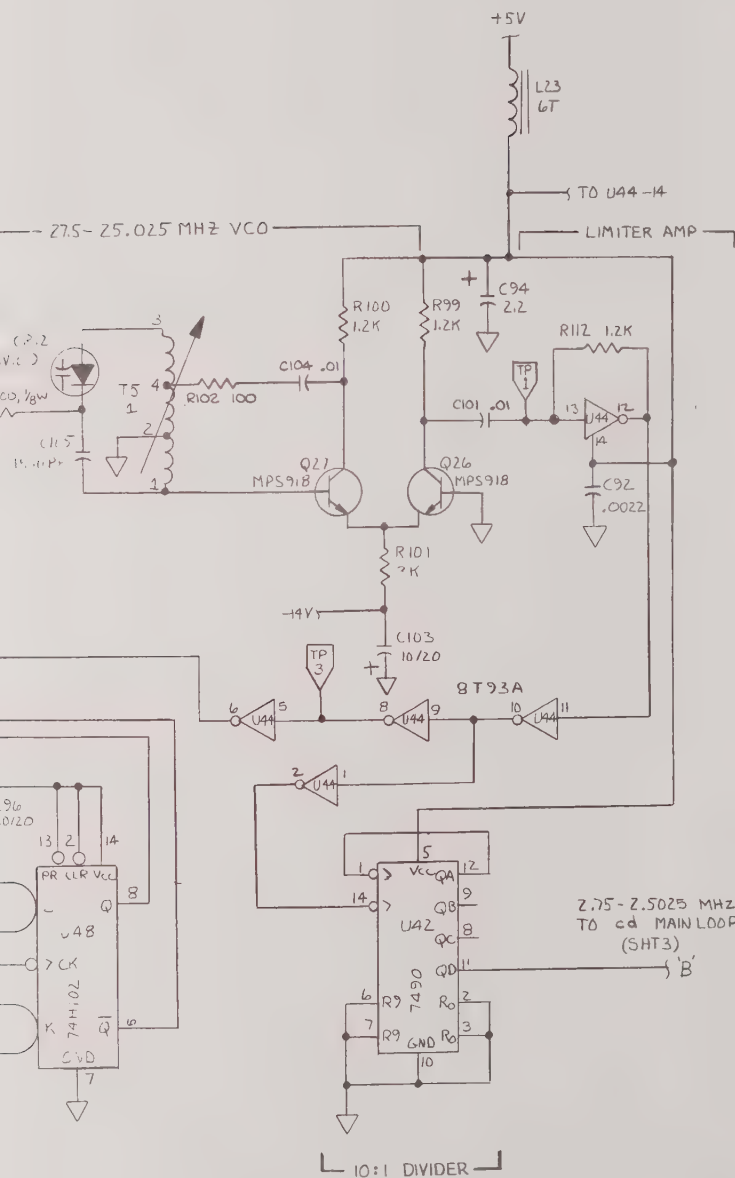
R117 47
+14V



— SEE SHT 1 FOR REV —

FLUKE 89536 TOLERANCE 001 10% DIA 101 20% DIA 201 50% DIA 501 100% DIA		JOHN FLUKE MFG CO. INC P.O. BOX 7428 SEATTLE WA DO NOT SCALE DRAWING DIMENSIONS IN INCHES DR. GENE KIRCHNER CHK ENR INI MATERIAL FINISH		REV 4-3-75 CHANGE DESCRIPTION PART NO SIZE DRAWING NO D 6011A-1001 SCALE SHT 3 OF 3	
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6010A-1002
SH 1 OF 5 REV D



NOTES:

- 1 UNLESS OTHERWISE SPECIFIED:
- (A) ALL CAPACITOR VALUES ARE IN MICROFARADS.
 - (B) ALL RESISTOR VALUES ARE IN OHMS.
 - (C) ALL INDUCTOR VALUES ARE IN MICROHENRIES.
 - (D) ALL GATE IC'S: PIN 14- FILTERED +5V
- PIN 7 - GND
2.  CR1 & CR2 ARE A MATCHED PAIR.
CR7 & CR10 ARE A MATCHED PAIR.
3. SEE 6010A-1602 FOR REF DES DRAWING.

LAST NO. USED

OPEN

R116	R2526,29,54,55,60,72,76,77,78,106
U50	U17,20,27,31,40,41,43
O39	Q1,2,10,11,28,29,32,33,34,35
L33	L28,29,30,31
CR12	CR6,11
C118	C3, ,106,108,109
T5	

2.75-2.5025 MHz
TO cd MAIN LOOP
(SHT3)

┌ 10:1 DIVIDER ─┐

5H4	D	C2, C10 WERE 22	WPM	Am	15
5H5		C102 WAS .01 ADDED +	WPM	15	11/30
		C49 WAS .01 ADDED +	WPM	15	
	-	RELEASE TO PRE-PRO	WPM	15	
	C	ADD C92	WPM	15	11/30
			WPM	15	11/30
C5			WPM	15	
C7	B	ADDED L39, C119; E103 WAS FAN DELETED C114	WPM	15	
C1		DEL. C97 FROM OPEN RESISTORS	WPM	15	
C2		C109 WAS 500P, ADD. pin 2 TO OV.44	WPM	15	
C3		ADDED TP3, J44 pin 3 WAS pin 7	WPM	15	
C4		REVERSED ORDER OF C104 & E102. P10	WPM	15	
C5	-	ADDED C14, 107.	WPM	15	
ZONE	REV	CHANGE DESCRIPTION	DR	CHK	APP

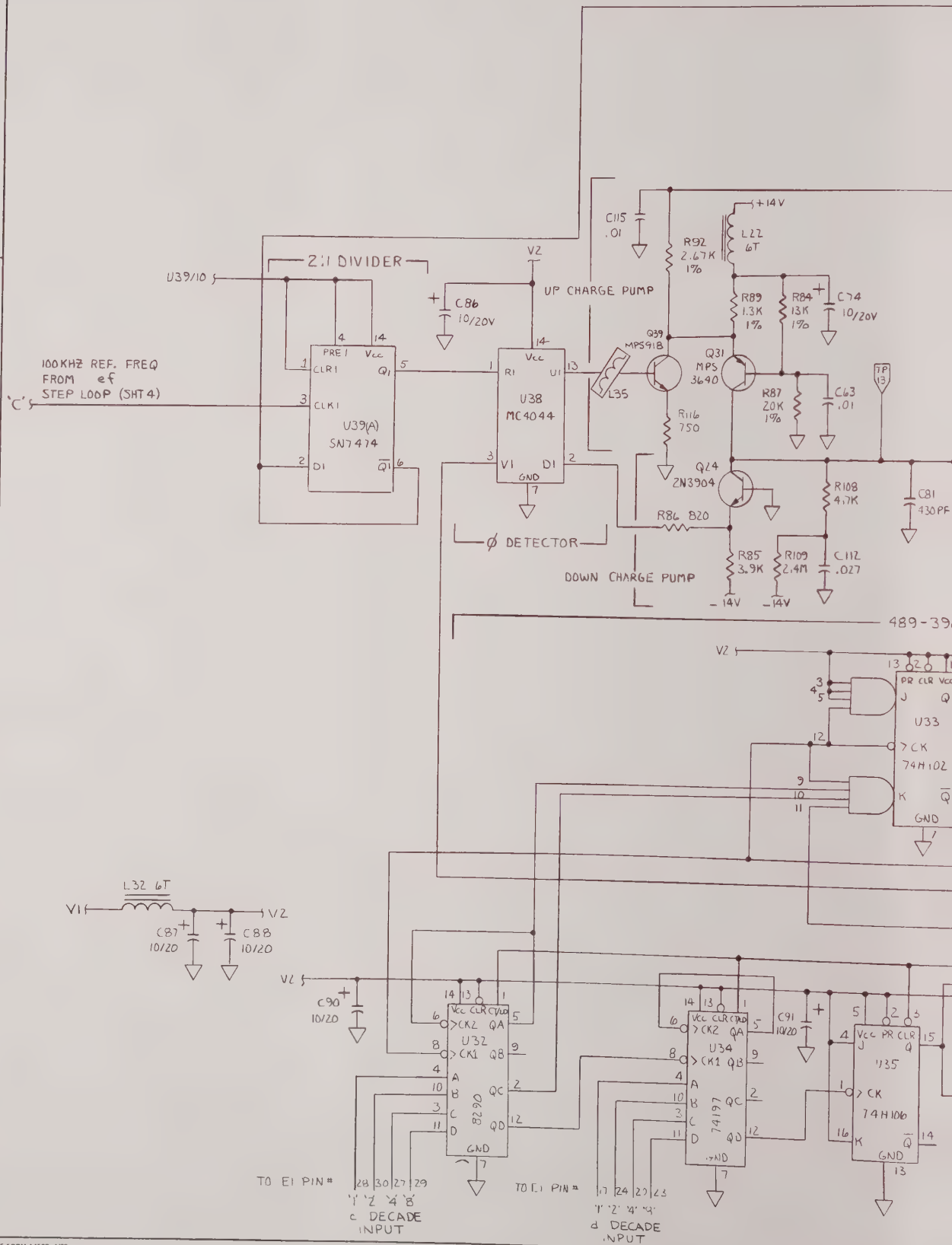
FLUKE 89536		JOHN FLUKE MFG. CO., INC. P.O. BOX 7478 SEATTLE WA		ORIGIN: 10-1-76 CHK: JEN ENG: B DATE: 5-2-76		6 DIGIT GENERATOR (ab STEP LOOP)	
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TOLERANCES XXX ± .020 XXX ± .010 ANGLES ±		.0005 .0001 DIA .101 .0002 DIA .201 .0001 DIA		.0003 .0002 .0004 .0002 .0005 .0002		DATE: 5-2-76 D	

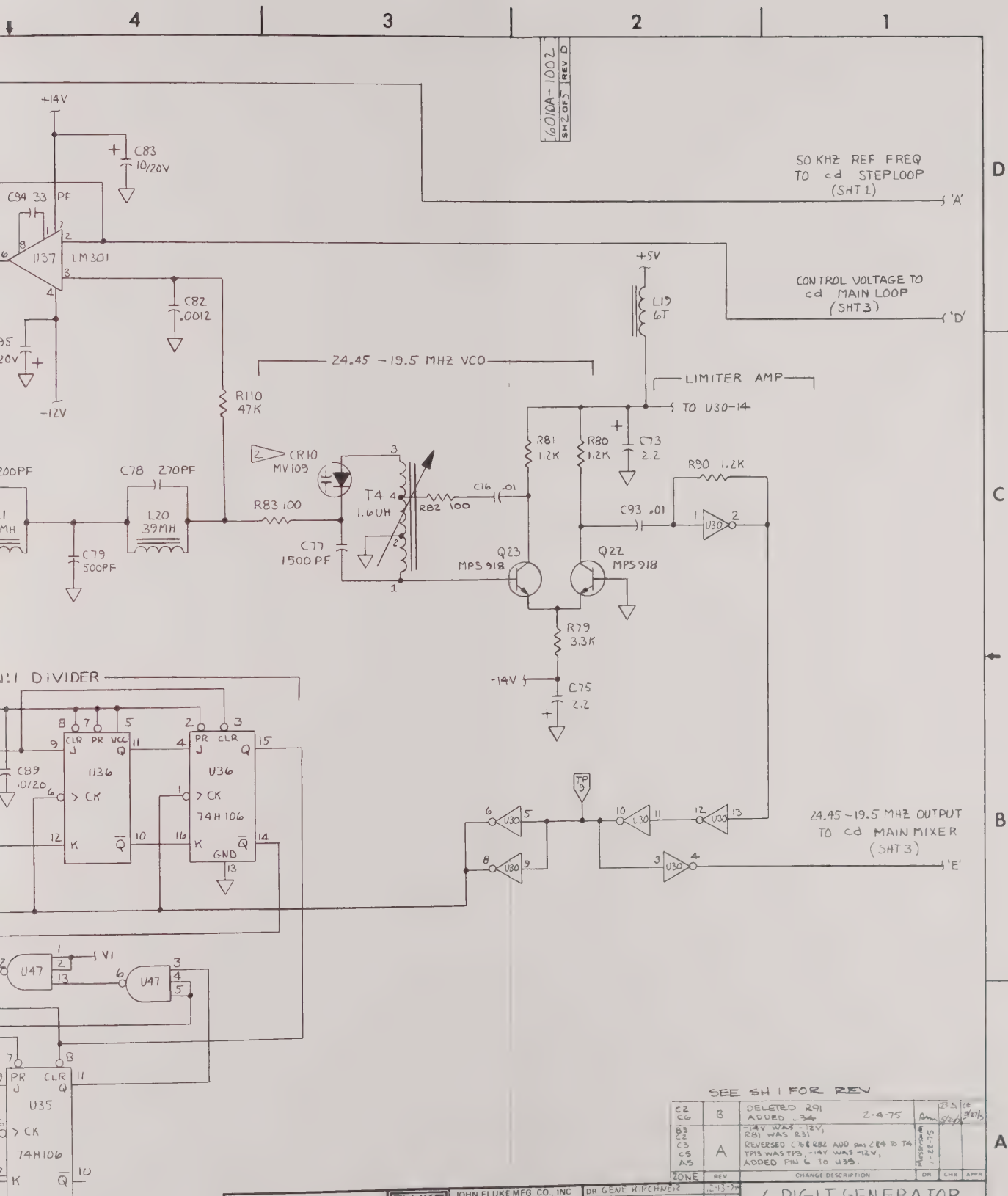
D

C

B

A





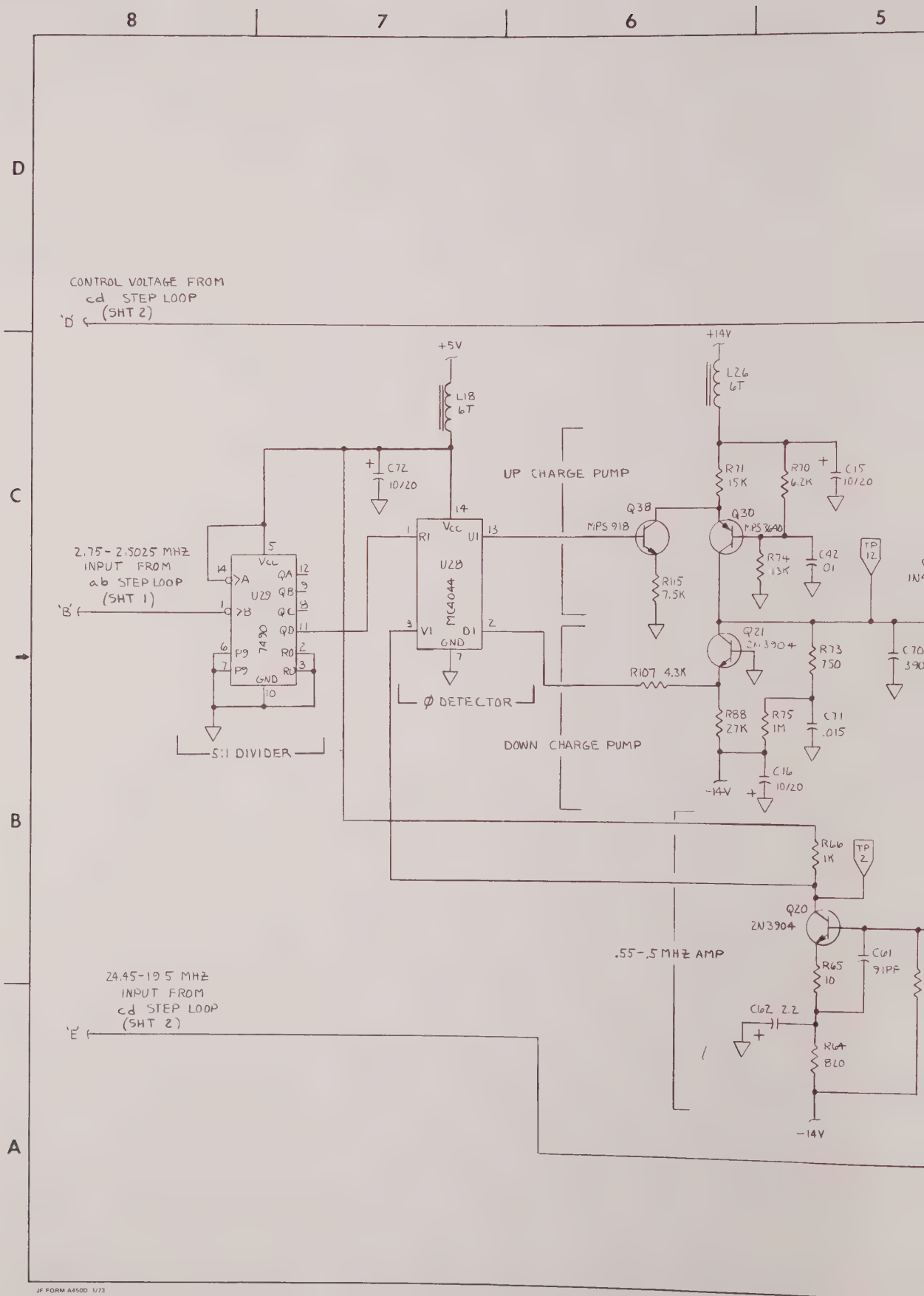
SEE SH 1 FOR REV

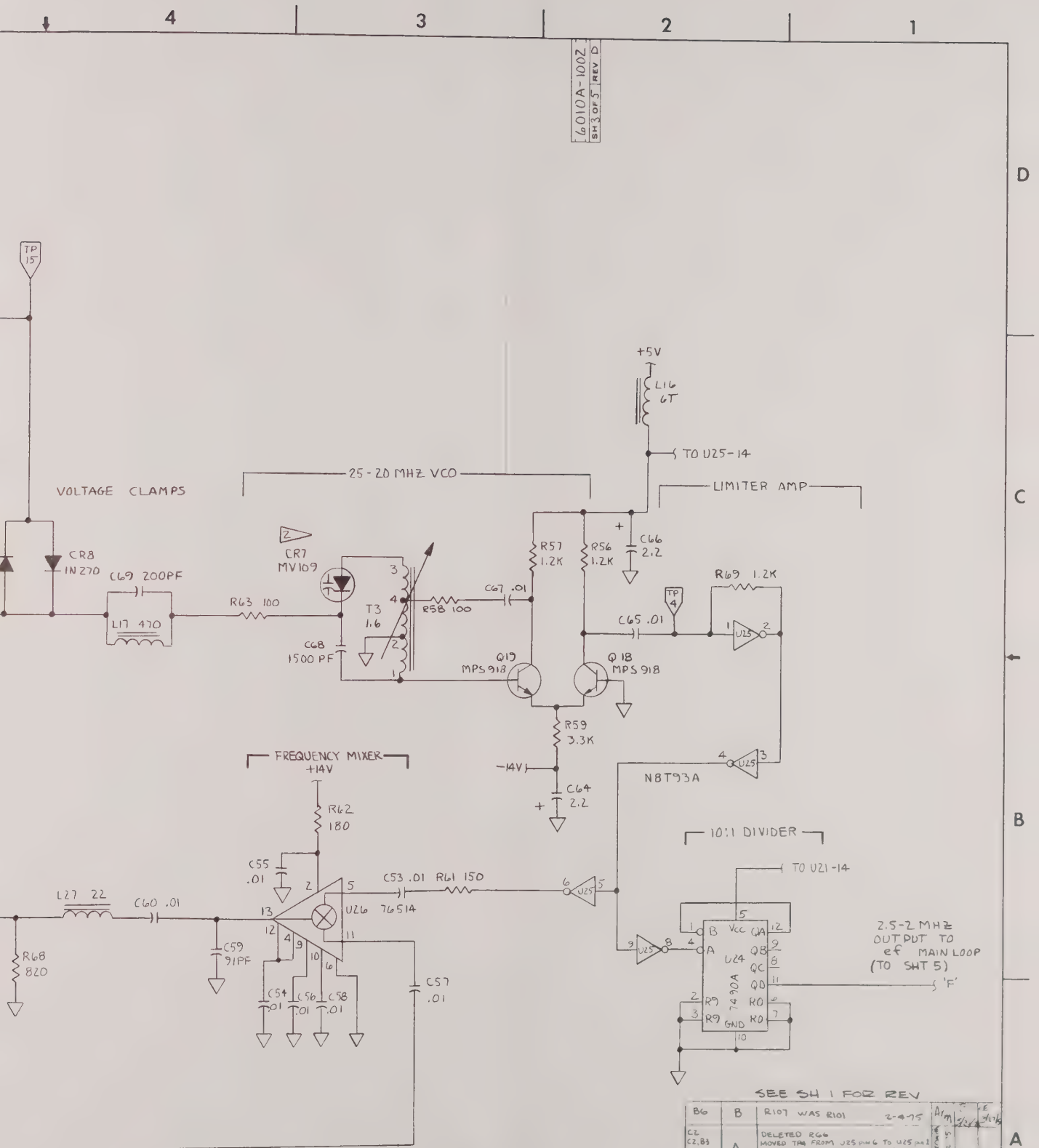
ZONE	REV	CHANGE DESCRIPTION	DR	CHK	APPR
B	3	DELETED R91 ADDED C34	2-4-75		
B	2	-14V WAS -12V; R81 WAS R81			
C	3	REVERSED C76 & R82 ADD pins C84 to T4			
C	5	TP13 WAS TP3; -14V WAS -12V; ADDED PIN 6 TO U35.			

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Mfg. Co. Inc.

FLUKE	JOHN FLUKE MFG CO., INC P.O. BOX 7428 SEATTLE WA	DR GENE K. SCHMEITZ CHK <i>Gene</i> ENG <i>Gene</i>	12-13-75
89536	DO NOT SCALE DRAWING DIMENSIONS IN INCHES	MATERIAL	FINISH
TOLERANCES			
XX ± .020	000-100 DIA	+ .001 / .002	
XXX ± .010	101-200 DIA	+ .004 / .002	
ANGLES ±	201-500 DIA	+ .006 / .003	
± .005	501-100 DIA	+ .010 / .005	

6 DIGIT GENERATOR (cd STEP LOOP)	
PART NO	SIZE
D	6010A-1002
SCALE	SHT 2 OF 5





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FLUKE		JOHN FLUKE MFG. CO., INC. P.O. BOX 7428, SEATTLE WA	
89536		DO NOT SCALE DRAWING DIMENSIONS IN INCHES	
TOLERANCES		MATERIAL	
XX ± .020	000-100 DIA	• .003 .007	
XXX ± .010	101-200 DIA	• .004 .007	
ANGLES 2°	201-500 DIA	• .006 .009	
°	501-100 DIA	• .010 .006	

DR. F. E. KIRCHNER		12/7/72	
CHK		ENG. J. S. H.	
1 No.		5/2/73	
FINISH			

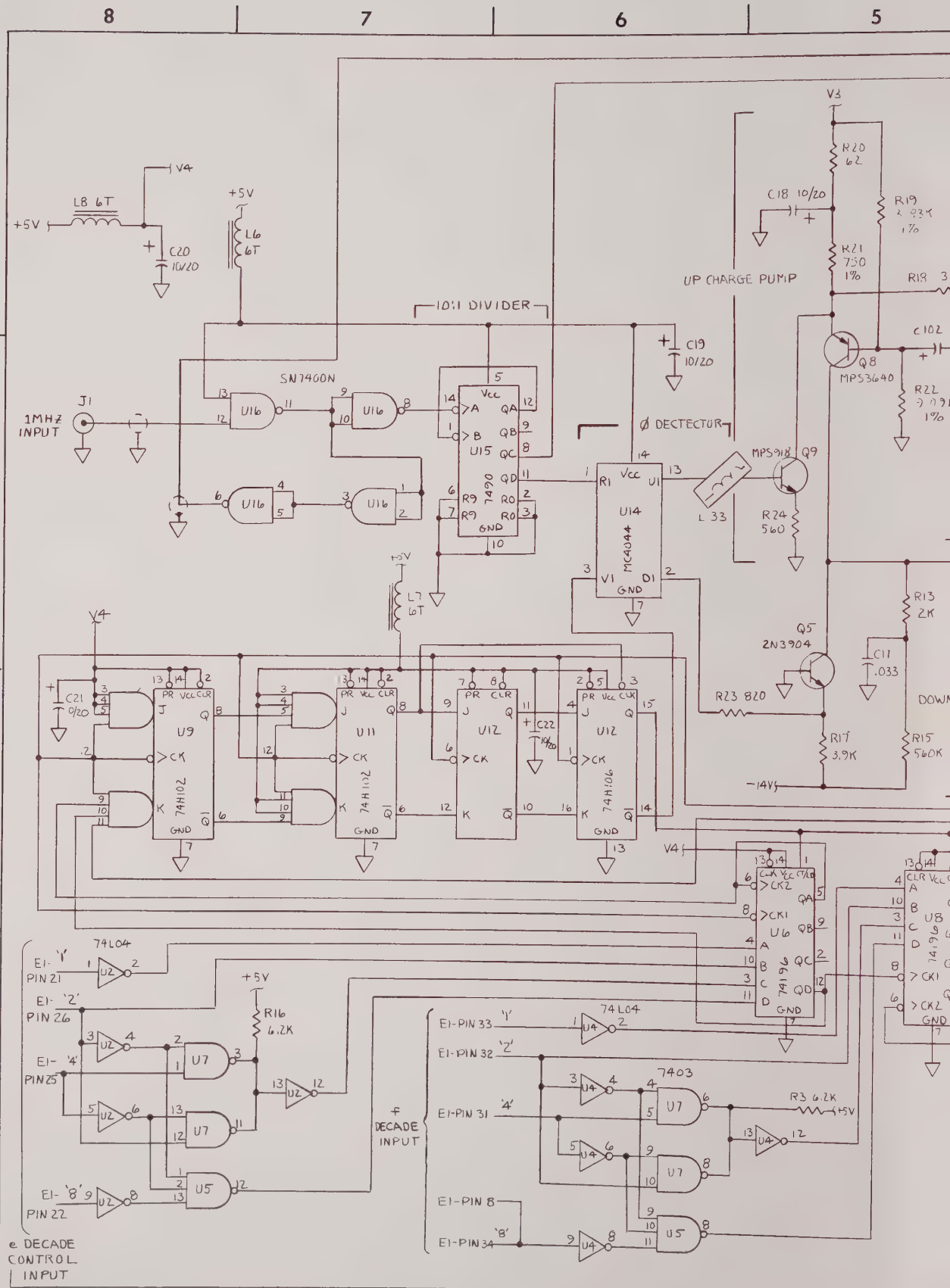
6 DIGIT GENERATOR (cd MAIN LOOP)			
PART NO.	SIZE	DRAWING NO.	
		D 6010A-1002	
SCALE	SHT	3 OF 5	REV. 5

D

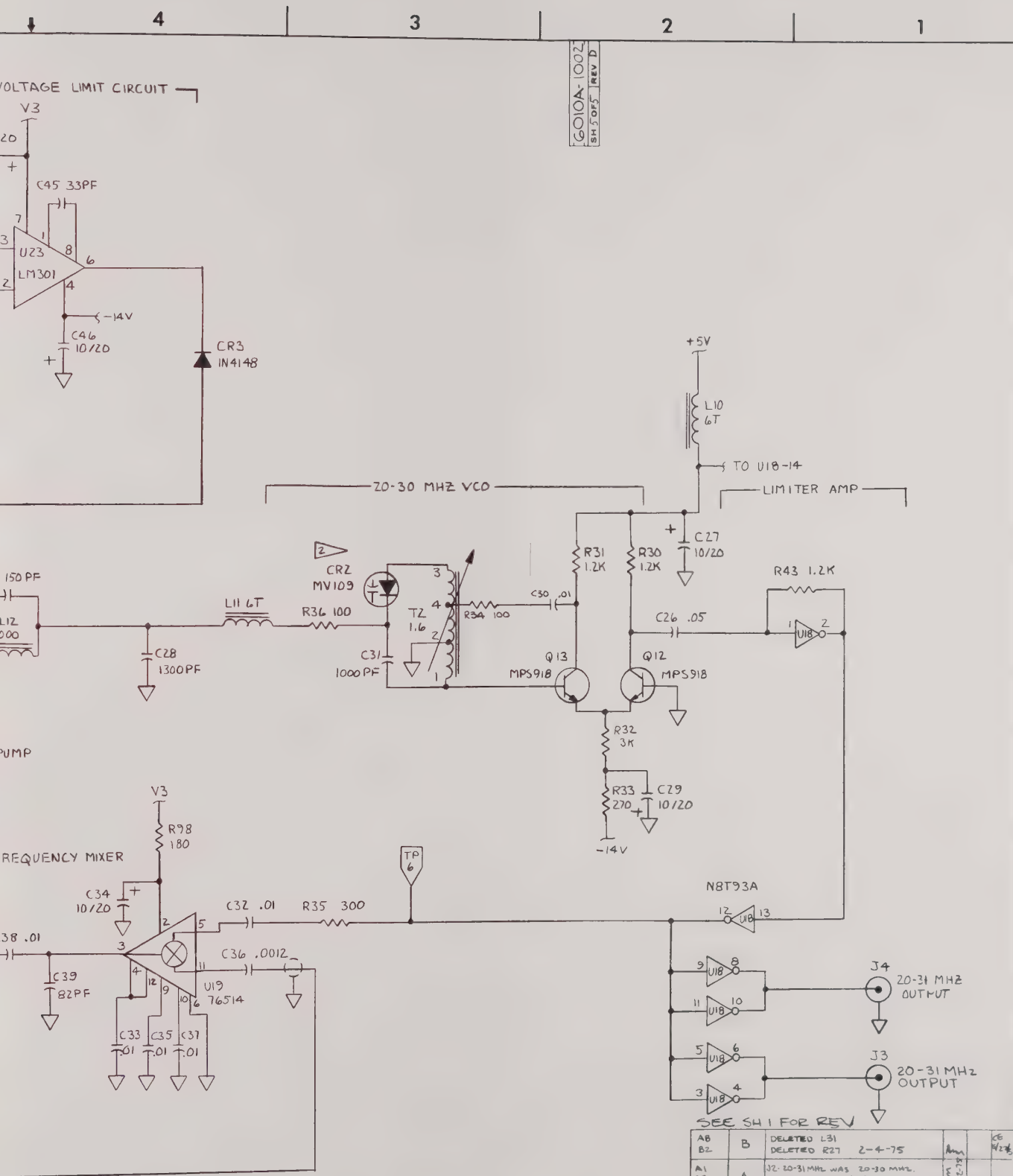
C

B

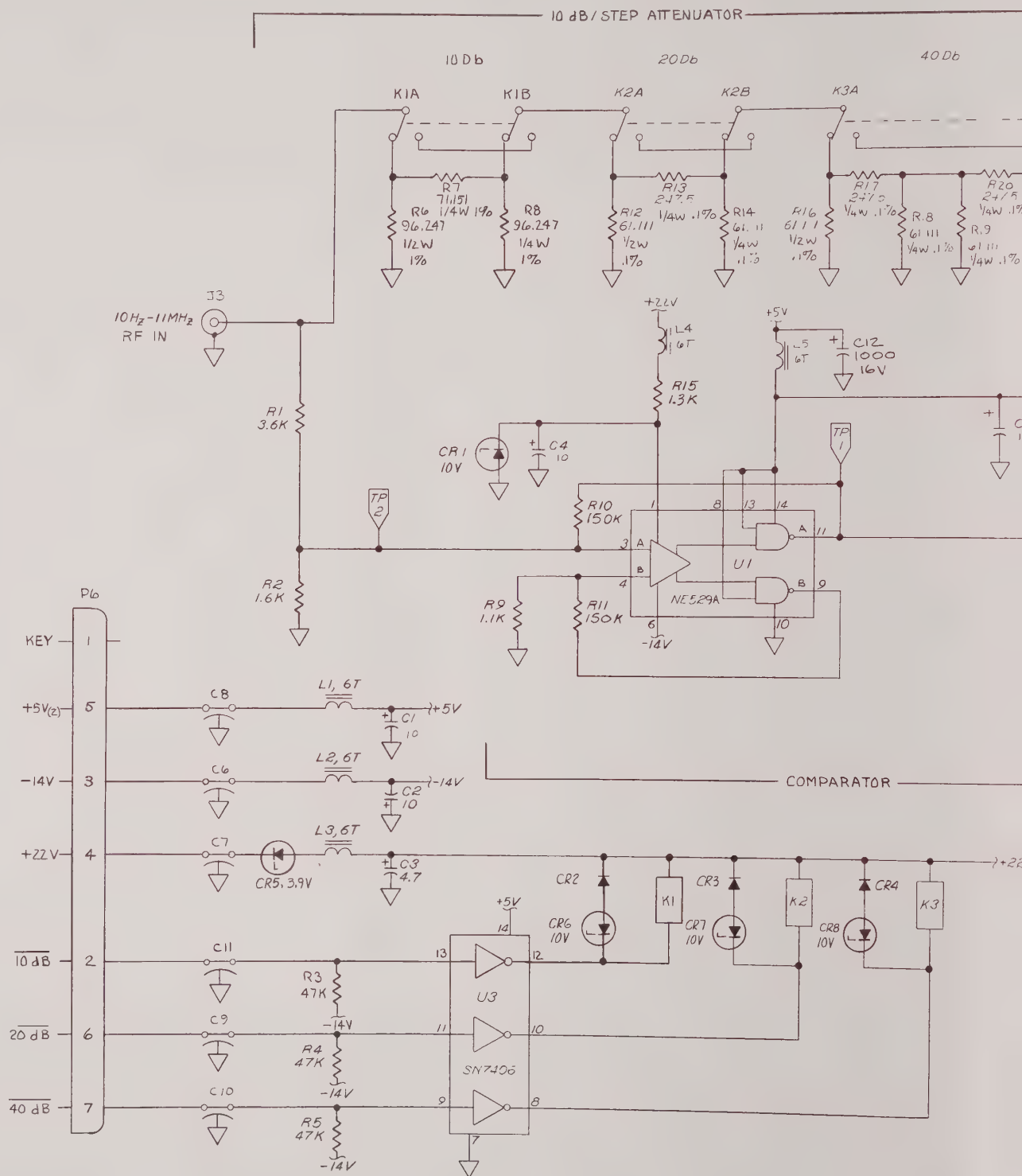
A



205-304 N:1 DIVIDER



FLUKE JOHN FLUKE MFG CO., INC. P.O. BOX 7428 SEATTLE WA		6 DIGIT GENERATOR (ef MAIN LOOP)	
89536	DO NOT SCALE DRAWING DIMENSIONS IN INCHES	DRAGNE KIRCHWEIR CHK J THELEN ENG J ENG	PART NO SIZE DRAWING NO D 6010A-1002
TOLERANCES XX ± .020 XXX ± .010 ANGLES 2 XC *	.000- .100 DIA +.003- .002 .101- .200 DIA +.004- .002 .201- .500 DIA +.006- .003 .501- 1.00 DIA +.010- .005	MATERIAL FINISH	SCALE SHT 5 OF 5 REV J



6011A-1003
SH / OF 1 REV C

BB

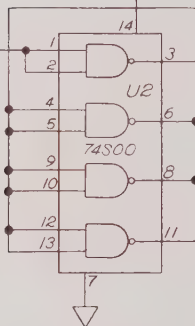
R21
0.1M
1/4W
1.2%

J1

10 MHz - 11 MHz RF OUT

J+

10 MHz - 11 MHz TTL OUT



NOTES:

1. FOR REF DES DRAWING SEE 6011A-1603.
2. UNLESS OTHERWISE NOTED:
CAPACITOR VALUES ARE IN MICROFARADS
RESISTOR VALUES ARE IN OHMS.

C	ADD "10dB STEP ATTENUATOR" & "COMPARATOR"	9-21-75
B	ADDED C12, R10 & R11 WERE 300K	8-21-75
A	ADDED CR5-CR8 R15 WAS 1.6K	6/24/75
REV	CHANGE DESCRIPTION	
SCHEMATIC DIAGRAM ATTN: SQ WAVE OUTPUT		
PART NO.	SIZE	DRAWING NO.
	D	6011A-1003
SCALE	SHT	OF 1

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JOHN FLUKE MFG CO. INC

P.O. BOX 7428 SEATTLE WA

89536

DO NOT SCALE DRAWING
DIMENSIONS IN INCHES

TOLERANCES

XX ± .020	.000	.100 DIA	.003	.002
XXX ± .010	.101	.200 DIA	.004	.002
ANGLES 1	.201	.500 DIA	.006	.003
XC	.501	1.000 DIA	.010	.005

DRGVEE KIRCHNER

CHKD R. MACLAREN

ENG

ENG

MATERIAL

FINISH

PART NO.

SIZE

DRAWING NO.

D

6011A-1003

SCALE

SHT

OF

1

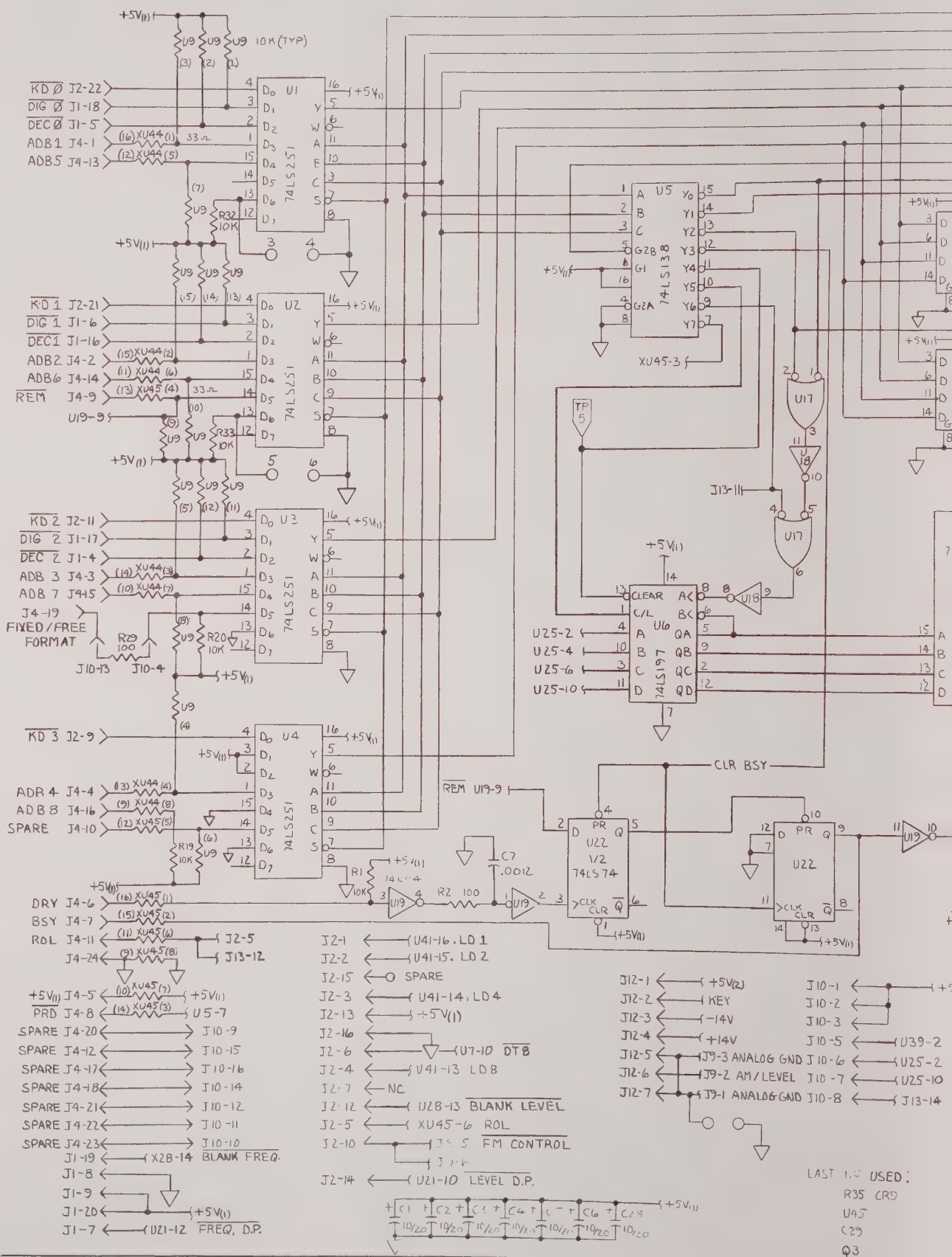
11

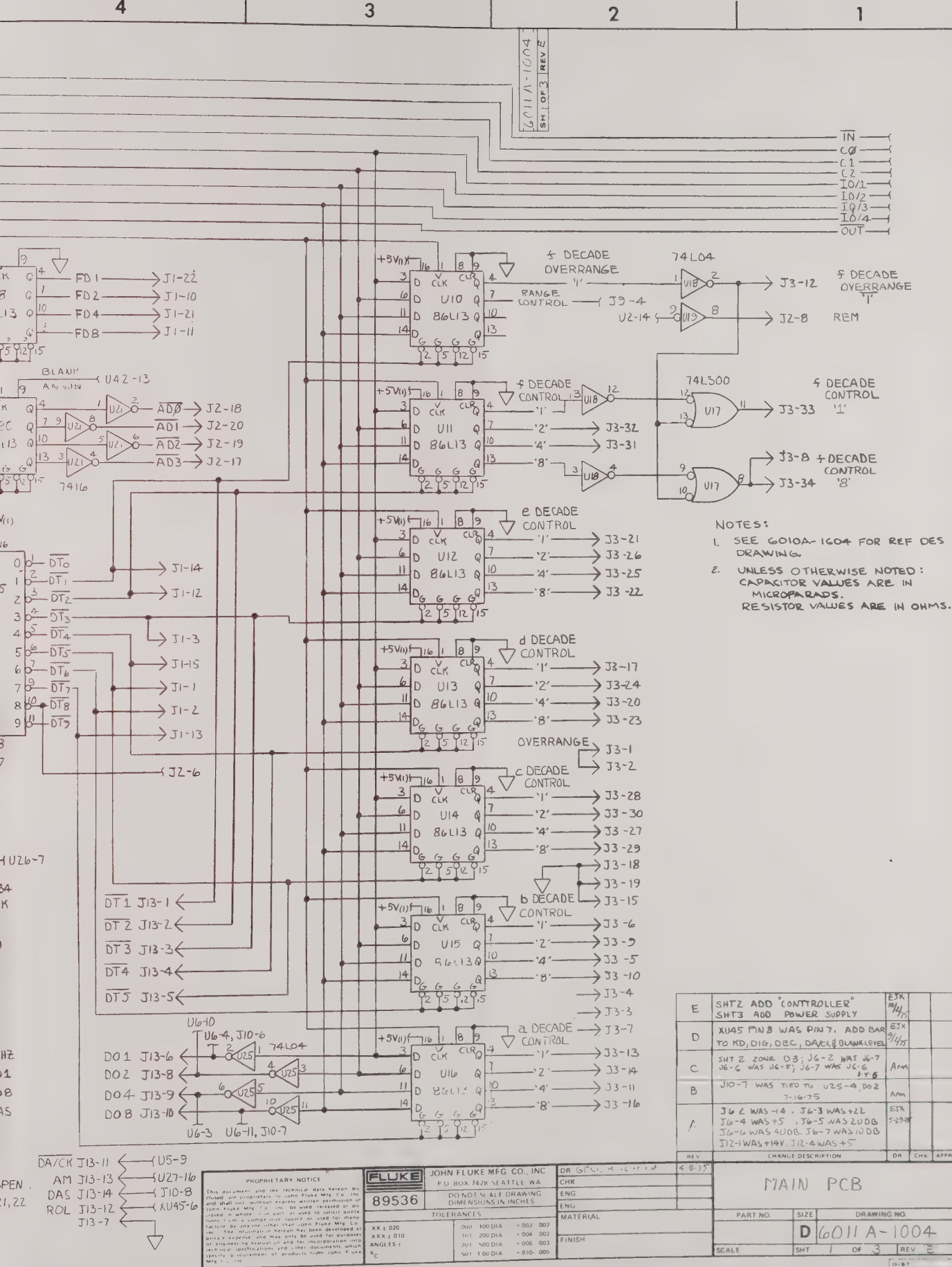
D

C

B

A





8

7

6

5

CONTROLLER

D

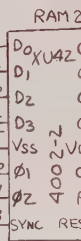
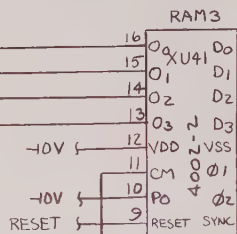
C

B

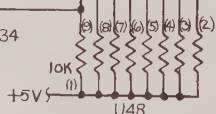
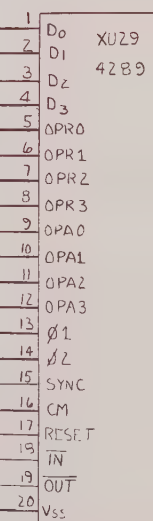
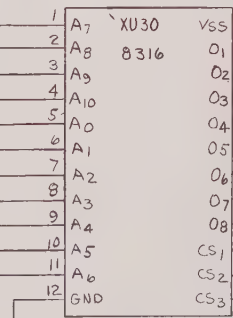
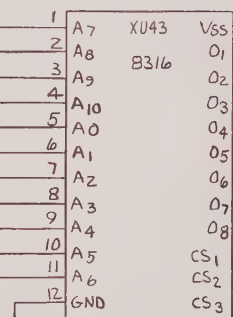
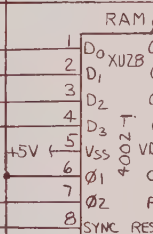
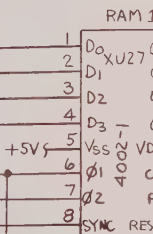
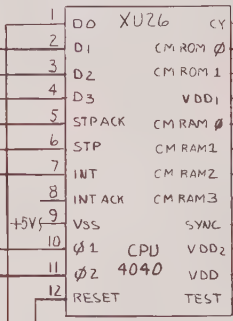
A

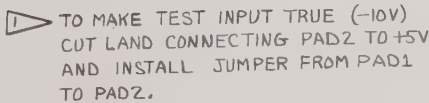
IN
C0
C1
C2
IO/1
IO/2
IO/3
IO/4
OUT

J2-1
J2-2
J2-3
J2-4



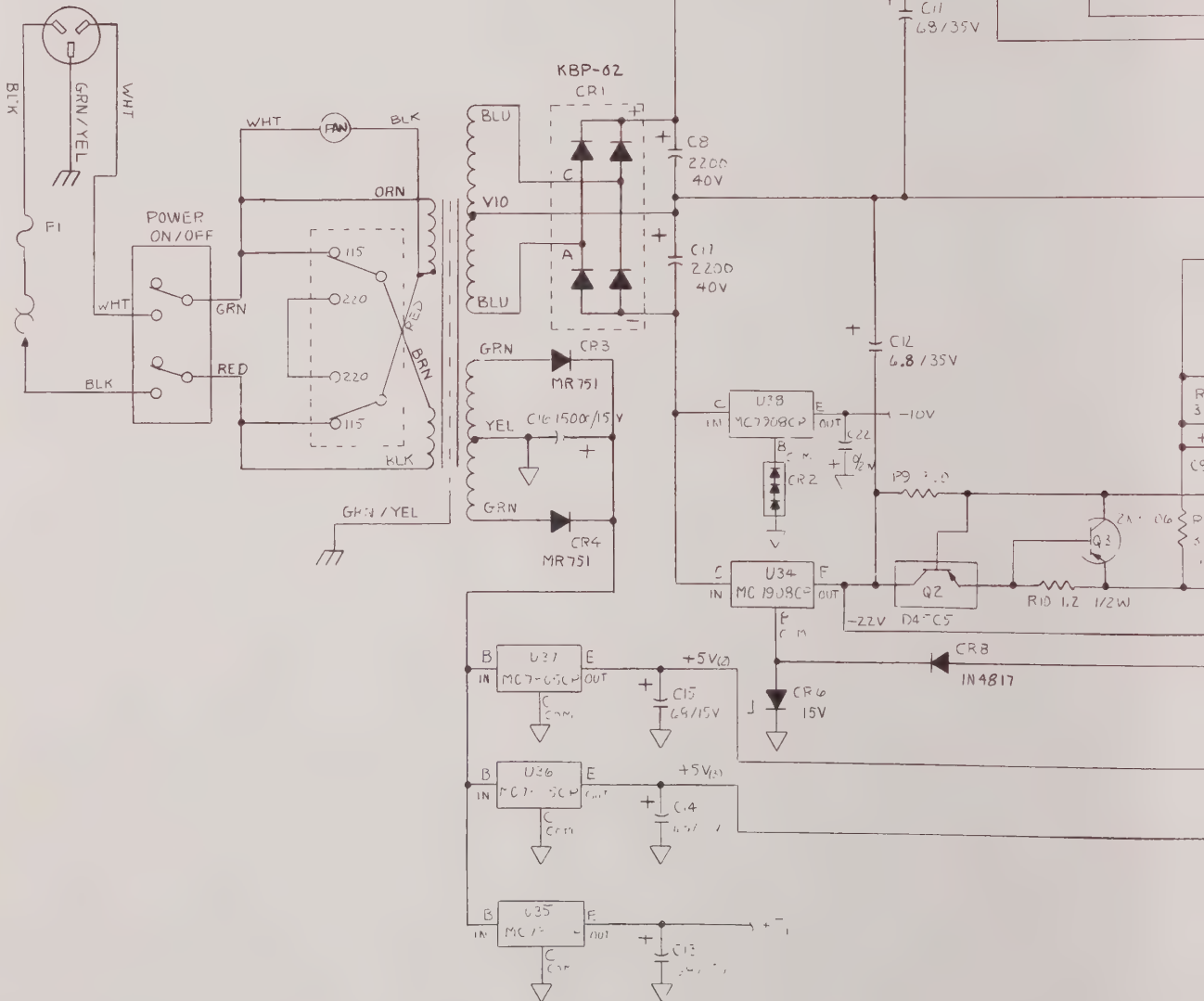
U19-10





PART NO.			SIZE	DRAWING NO	
_____			D	6011A-1004	
SCALE	_____	SHEET	_____	OF	_____

POWER SUPPLY



6011A-1004
SH3 OF 3 REV E

J9

- J12-7 → 1 ANALOG GND
 J12-6 → 2 AM/LEVEL ANALOG
 J12-5 → 3 ANALOG GND
 U10-7 → 4 RANGE CONTROL
 → 5 KEY
 J12-10 → 6 FM CONTROL

J8

- 1 +14V
 → 2 -14V
 → 3 +5V₍₂₎
 U25-8 → 4 FM
 J12-10 → 5 FM CONTROL
 → 6 KEY

FM

J7

- 1 +14V
 → 2 KEY
 → 3 -14V
 → 4 +5V₍₂₎
 → 5
 → 6

PHASE LOCK

J6

- 1 KEY
 U18-6 → 2 10dB
 → 3 -14V
 → 4 +22V
 → 5 +5V₍₂₎
 U19-12 → 6 20dB
 U19-6 → 7 40dB

ATTEN

J5

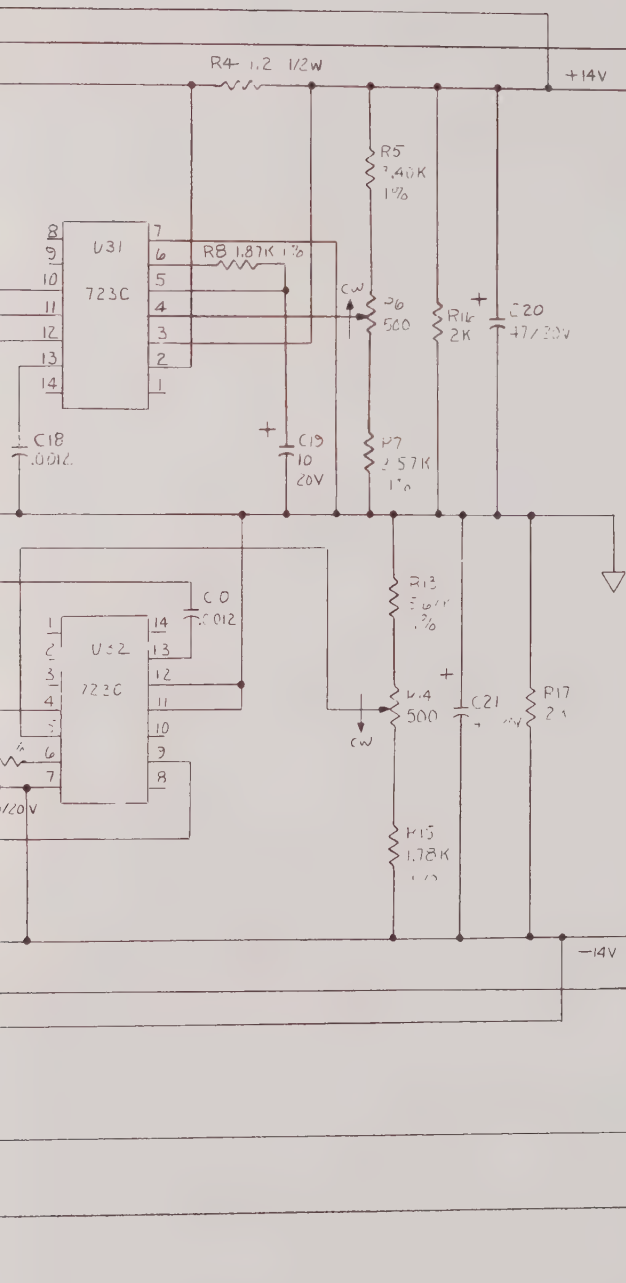
- 1 -14V
 → 2 +14V
 → 3 KEY
 → 4 +22V
 → 5 -22V
 → 6 +5V₍₂₎

INPUT / OUTPUT

J11

- 1 +14V
 → 2 KEY
 → 3 +14V
 → 4 +14V
 → 5
 → 6

6 DIGIT GEN



SEE CHART FOR REV

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P.O. BOX 7428 SEATTLE WA

89536

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DIMENSIONS IN INCHES

TOLERANCES

XX ± .020	000 100 DIA	± .003 .002
XXX ± .010	101 200 DIA	± .004 .002
ANGLES	201 500 DIA	± .006 .003
Xc	501 1.00 DIA	± .010 .005

DRAWING NO

CHK

ENG

ENG

MATERIAL

FINISH

CHANGE DESCRIPTION

DR

CHK

APPR

PART NO

SIZE

DRAWING NO

D

6011A-1004

SCALE

SHT

3

OF

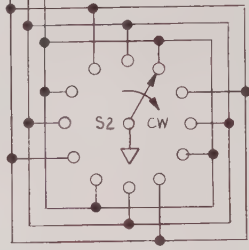
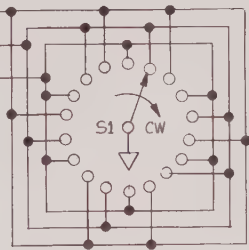
3

REV

E

DIST

P1-4 > DEC 2
 P1-16 > DEC 1
 P1-5 > DEC 0
 P1-17 > DIG 2
 P1-6 > DIG 1
 P1-18 > DIG 0



TP

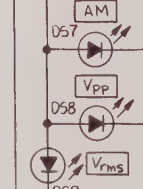
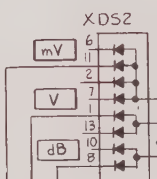
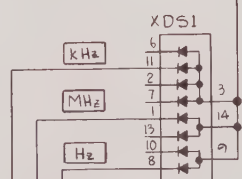
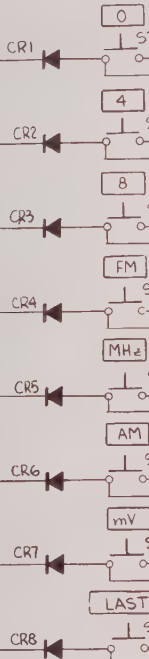
CONTINUED ON SHEET 2

P2-22 > KD 0
 P2-21 > KD 1
 P2-11 > KD 2
 P2-9 > KD 3
 P1-14 > DT 1
 P1-12 > DT 2
 P1-3 > DT 3
 P1-15 > DT 4
 P1-1 > DT 5
 P1-2 > DT 6
 P1-13 > DT 7
 P2-6 > DT 8

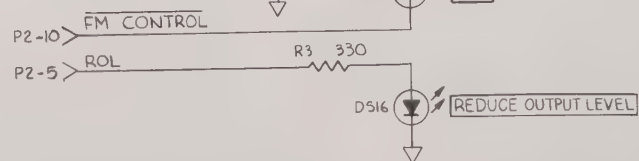
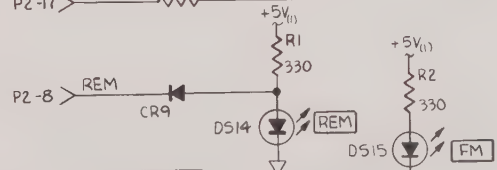
P2-13 > +5V_{in}
 P1-9 >
 P1-20 >

P1-8 >
 P2-16 >

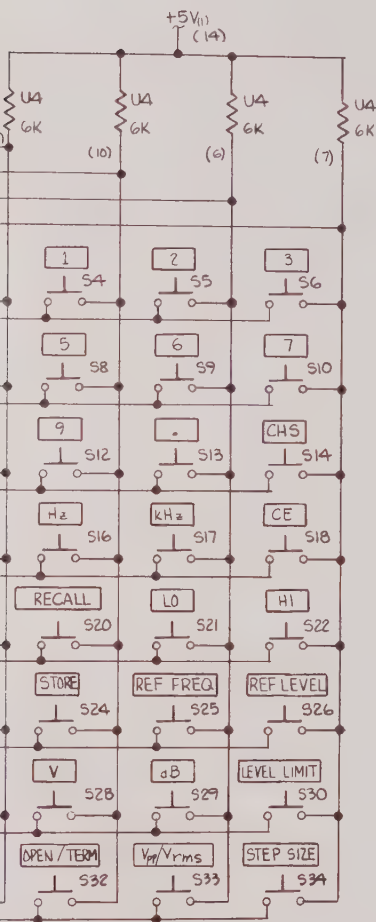
P2-7 > NC
 P2-15 > NC



P2-18 > AD 0 R11 47
 P2-20 > AD 1 R12 47
 P2-19 > AD 2 R13 47
 P2-17 > AD 3 R14 47



6011A-1005
SH 1 OF 2 REV -



NOTES:

- UNLESS OTHERWISE SPECIFIED:
RESISTOR VALUES ARE $\frac{1}{4}$ W, 5%.
CAPACITOR VALUES ARE IN MICROFARADS.
- "U" REF DES WITH RESISTORS REFER TO RESISTOR NETWORKS CONTAINED IN D.I.P. PACKAGES. THE NUMBERS IN PARENTHESES REFER TO D.I.P. PIN NUMBERS.
- P1 AND P2 MATE WITH 6011A-1004-J1 AND J2 RESPECTIVELY.
- LAST REF DES USED:
C2
CR9
DS30
U7
R17
S34
Q8
- REF DES NOT USED:
U3
R9, R10
- Q1 THRU Q8 ARE 2N4403.

CONTINUED ON SHEET 2

LEVEL LIMIT
DS28

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P.O. BOX 7428 SEATTLE WA.
89536
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DIMENSIONS IN INCHES
TOLERANCES
XX ± .020
XXX ± .010
ANGLES ± —
XX ± .020
101 100 DIA ± .003 .002
101 200 DIA ± .004 .002
201 500 DIA ± .006 .001
501 1.00 DIA ± .010 .005

DR. D. MESSERAMITH
CHK
ENG
ENG
MATERIAL
FINISH

REV
CHANGE DESCRIPTION
DR. CHK. APPR.
PART NO.
SIZE
DRAWING NO.
SCALE
SHT 1 OF 2
REF —
DISPLAY,
SCHEMATIC
6011A-1005

D

CONTINUED FROM SHT 1

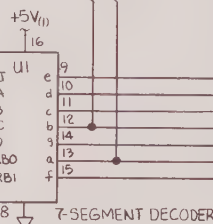
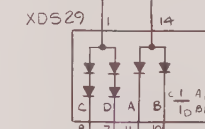
N
P
J

C

FREQUENCY
DISPLAY
DATA

PI-22 > FD1
PI-10 > FD2
PI-21 > FD4
PI-11 > FD8
PI-19 > BLANK FREQ

PI-7 > FREQ D.P.



R15 47



B

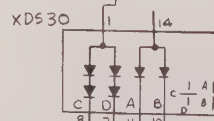
CONTINUED FROM SHT 1

K
L
M

LEVEL
DISPLAY
DATA

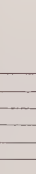
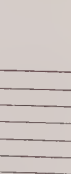
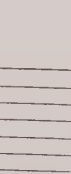
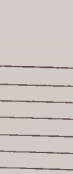
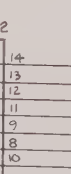
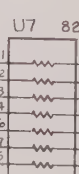
P2-1 > LD1
P2-2 > LD2
P2-3 > LD4
P2-4 > LDB
P2-12 > BLANK LEVEL

P2-14 > LEVEL D.P.



R7 33

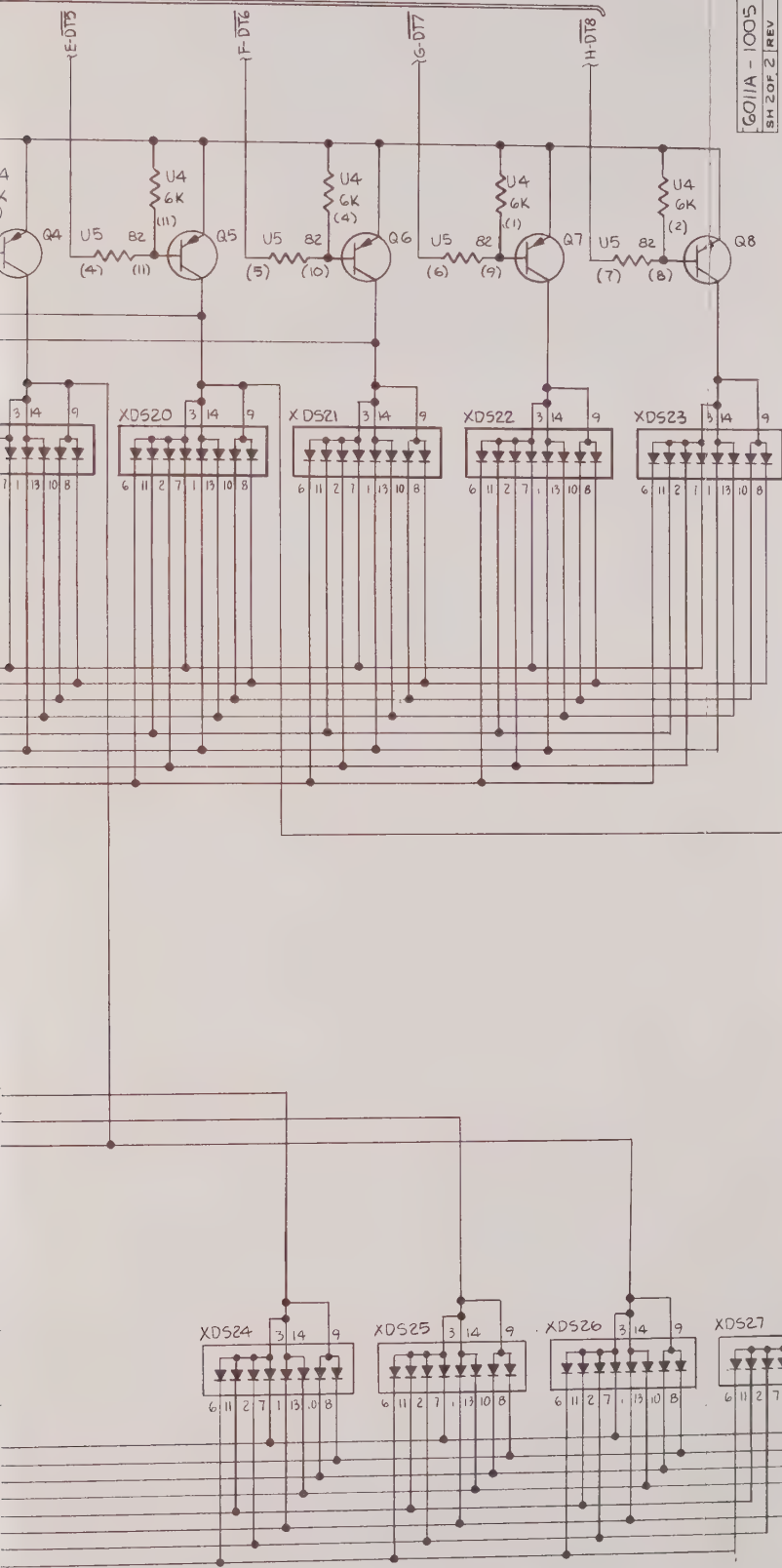
R8 33



R4 47

A

FROM SHEET 1



G011A - 1005
SH 2 OF 2 REV

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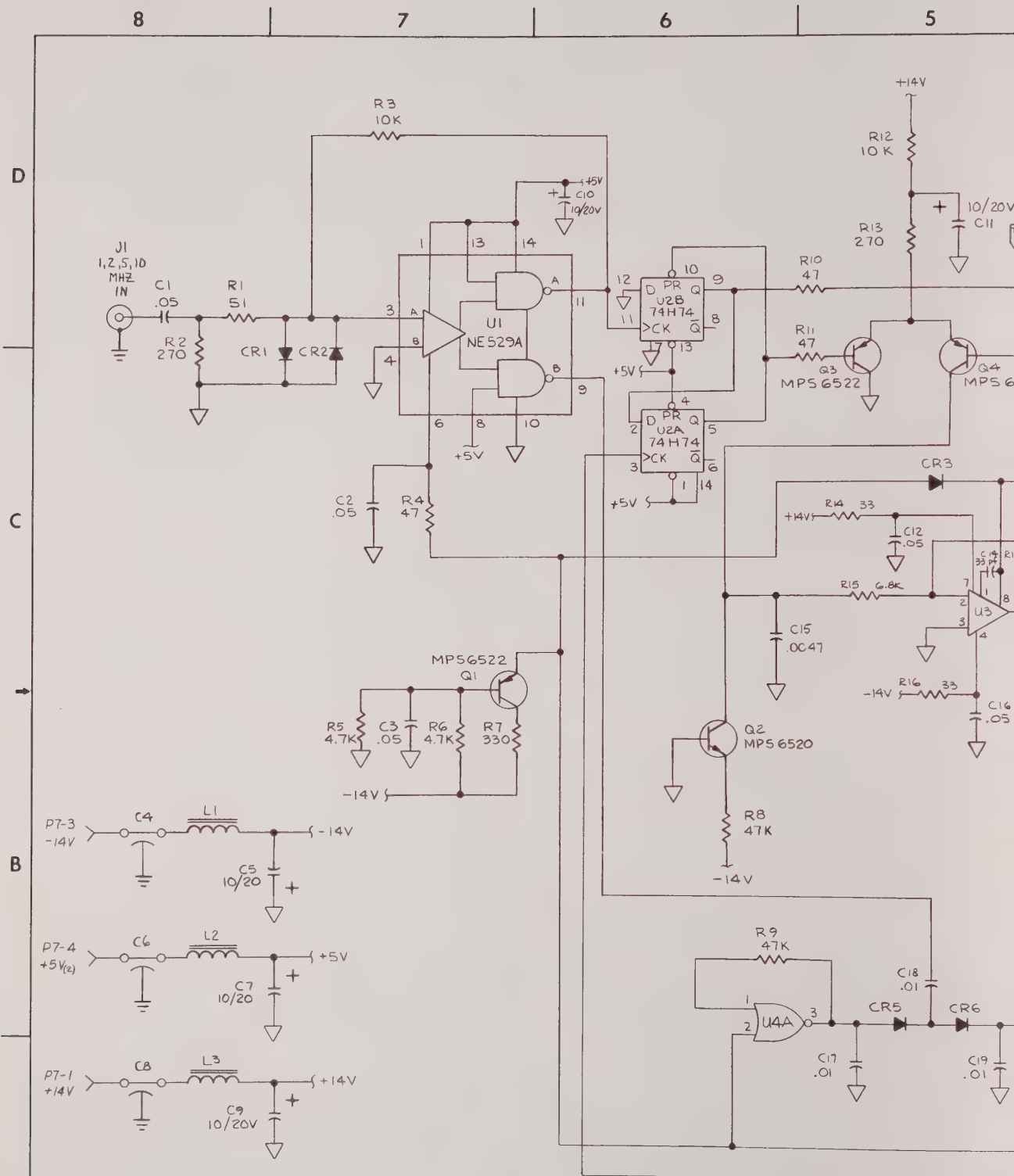
FLUKE
89536

JOHN FLUKE MFG. CO., INC.
P.O. BOX 7428, SEATTLE WA
DO NOT SCALE DRAWING
DIMENSIONS IN INCHES
TOLERANCES
XXX ± 0.20
XXX ± 0.10
ANGLES ± 0.05
XXX ± 0.05
XXX ± 0.02
XXX ± 0.01
XXX ± 0.005
XXX ± 0.002
XXX ± 0.001
XXX ± 0.0005
XXX ± 0.0002
XXX ± 0.0001

DR. A. Messersmith
CHK
ENG
ENG
MATERIAL
FINISH

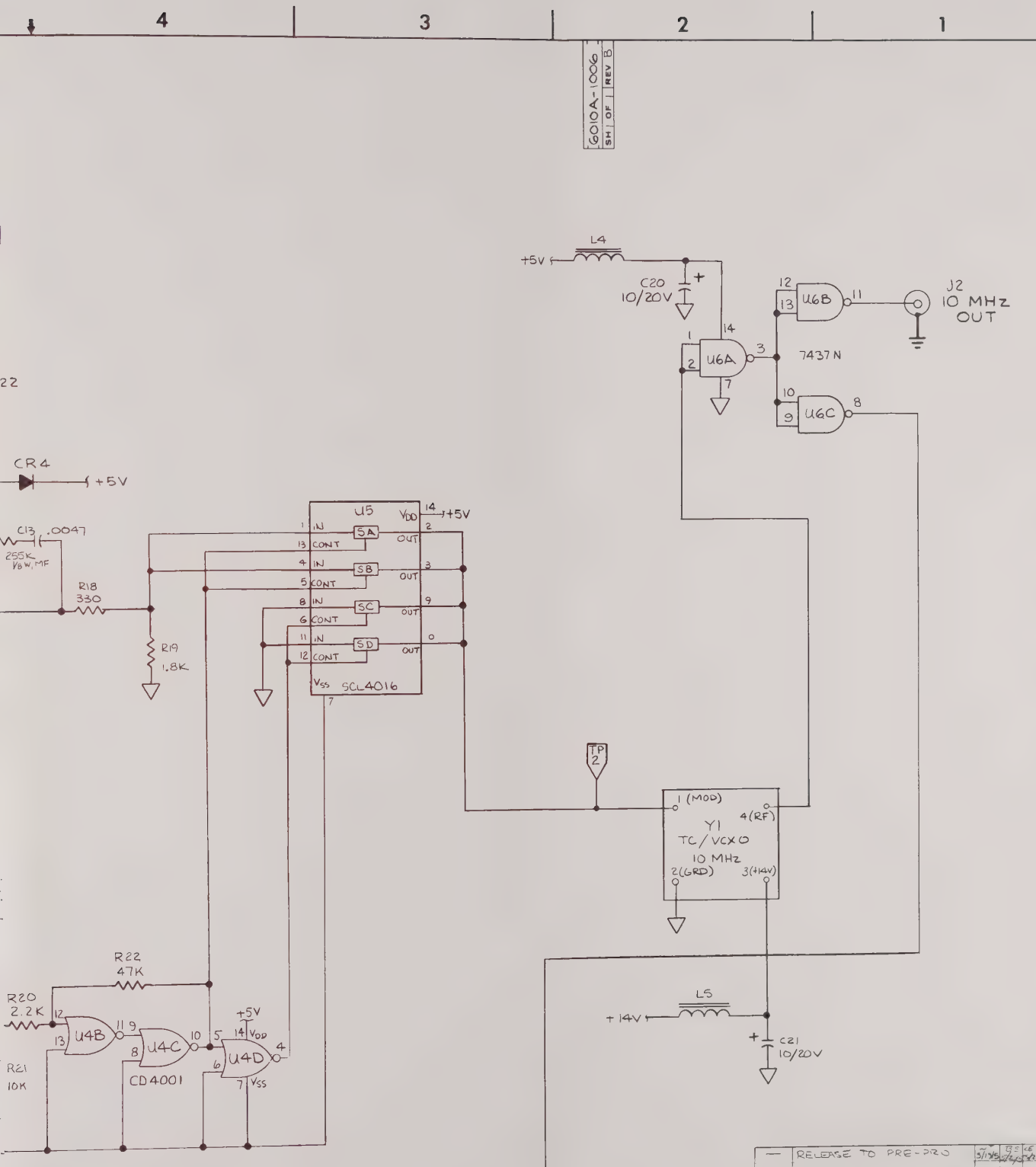
REV	CHANGE DESCRIPTION	DR	CHK	APPR
4/24/5				
DISPLAY, SCHEMATIC				
PART NO.	SIZE	DRAWING NO.		
—	D	6011A - 1005		
SCALE	—	SHT	2 OF 2	REV

DIST



NOTES: UNLESS OTHERWISE NOTED:

1. ALL CAPACITOR VALUES ARE IN MICROFARADS.
2. ALL RESISTOR VALUES ARE IN OHMS.
3. SEE 6010A-1606 FOR REF DES D



LAST NR USED:

U6 C21 Q4
R22 CR6 L5

—	RELEASE TO PRE-PRO	5/1/75	8316
B	ADDED P7	3-28-75	Am
A	REVISED LAYOUT OF U5. ADDED NOTE 3.	2-28-75	Am
REV	CHANGE DESCRIPTION	DR	CHK APPR

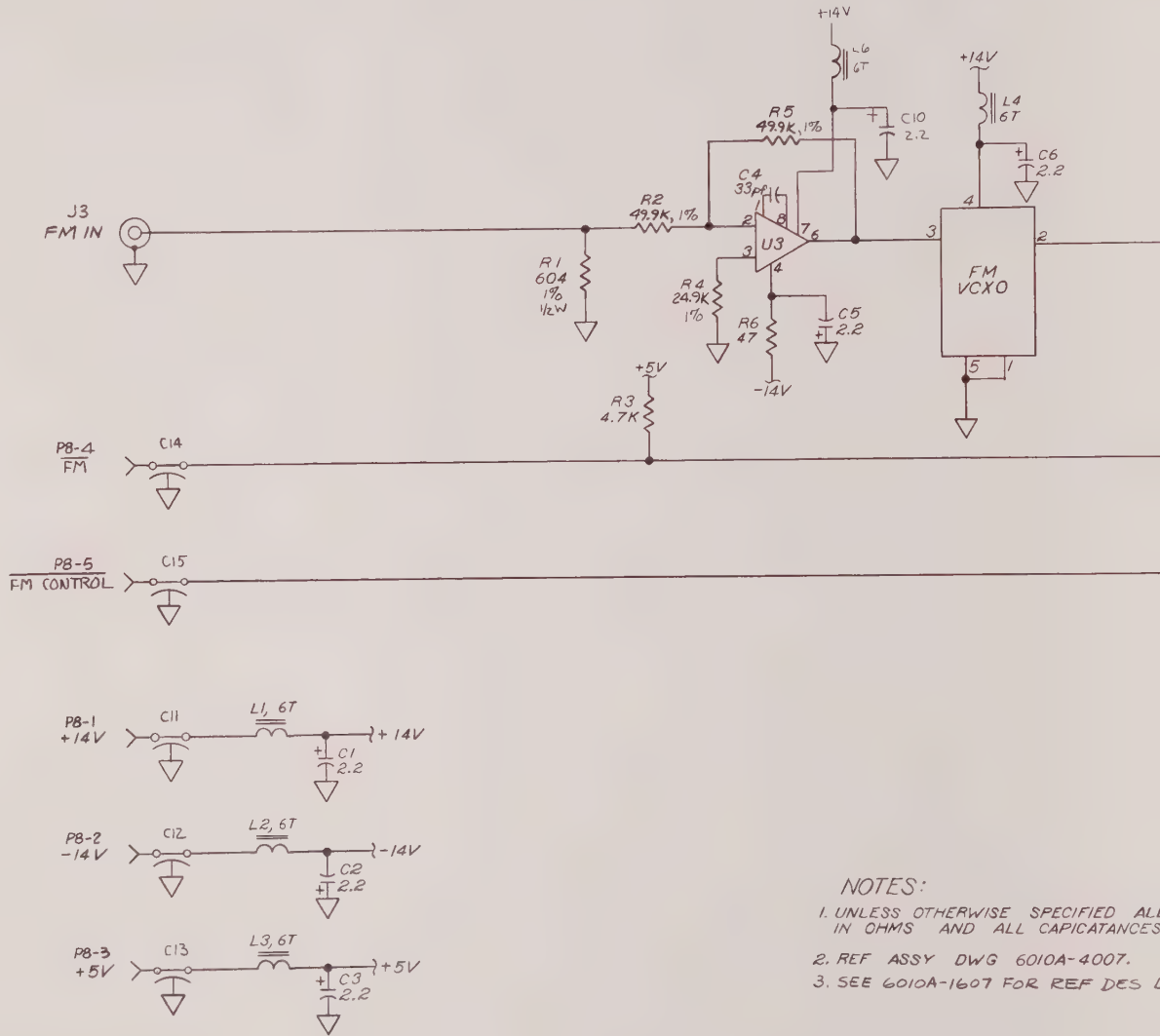
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TOLERANCES XX ±.020 XXX ±.010 ANGLES ± XC =		.000-.100 DIA .101-.200 DIA .201-.500 DIA .501-1.00 DIA		+.003-.002 +.004-.002 +.006-.003 +.010-.005		DIB	

D

C

B

A



LAST N° USED:

OPEN:

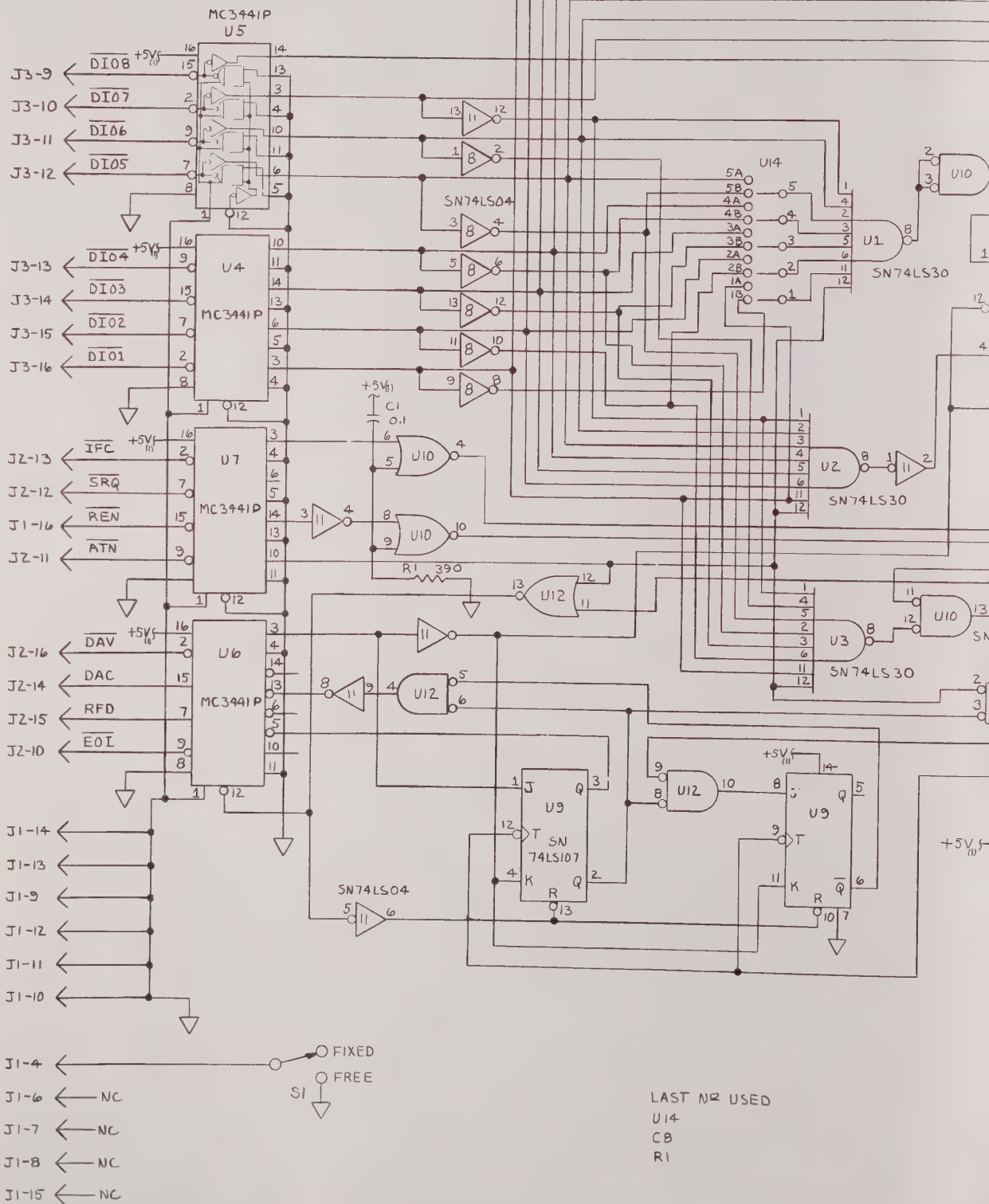
 C15
 L6
 R7
 U3

D

C

B

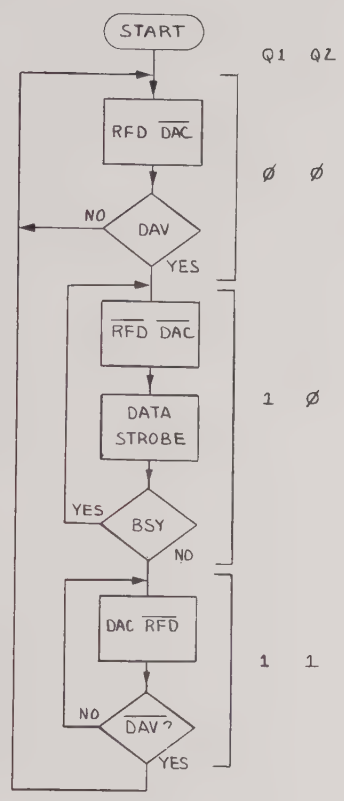
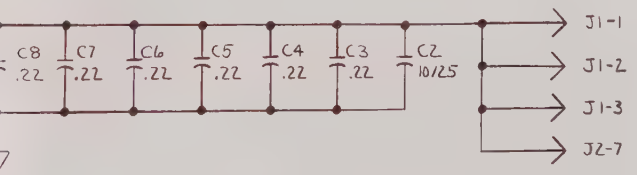
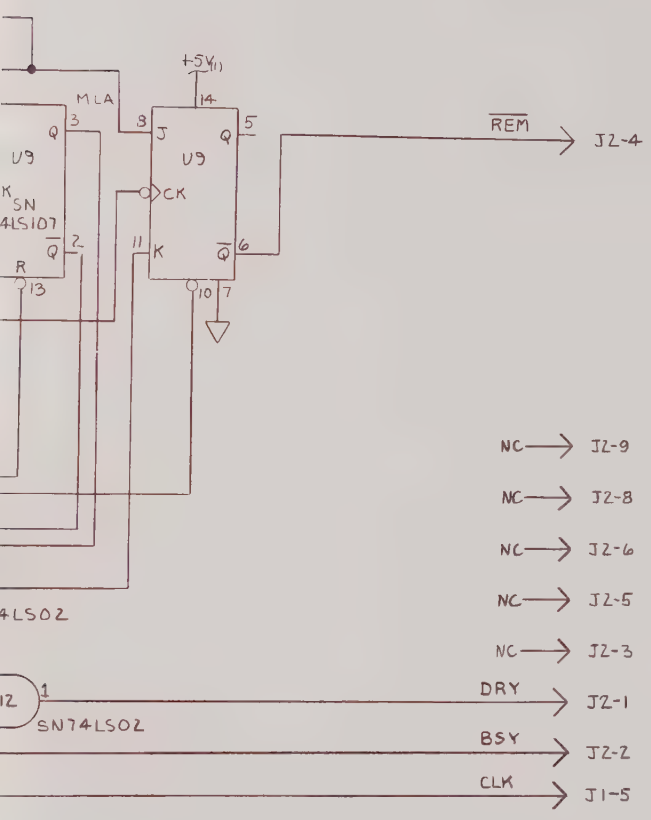
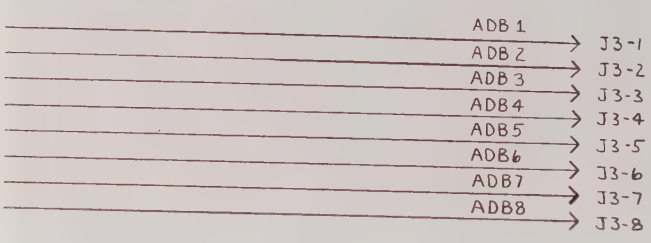
A



6010A-1008

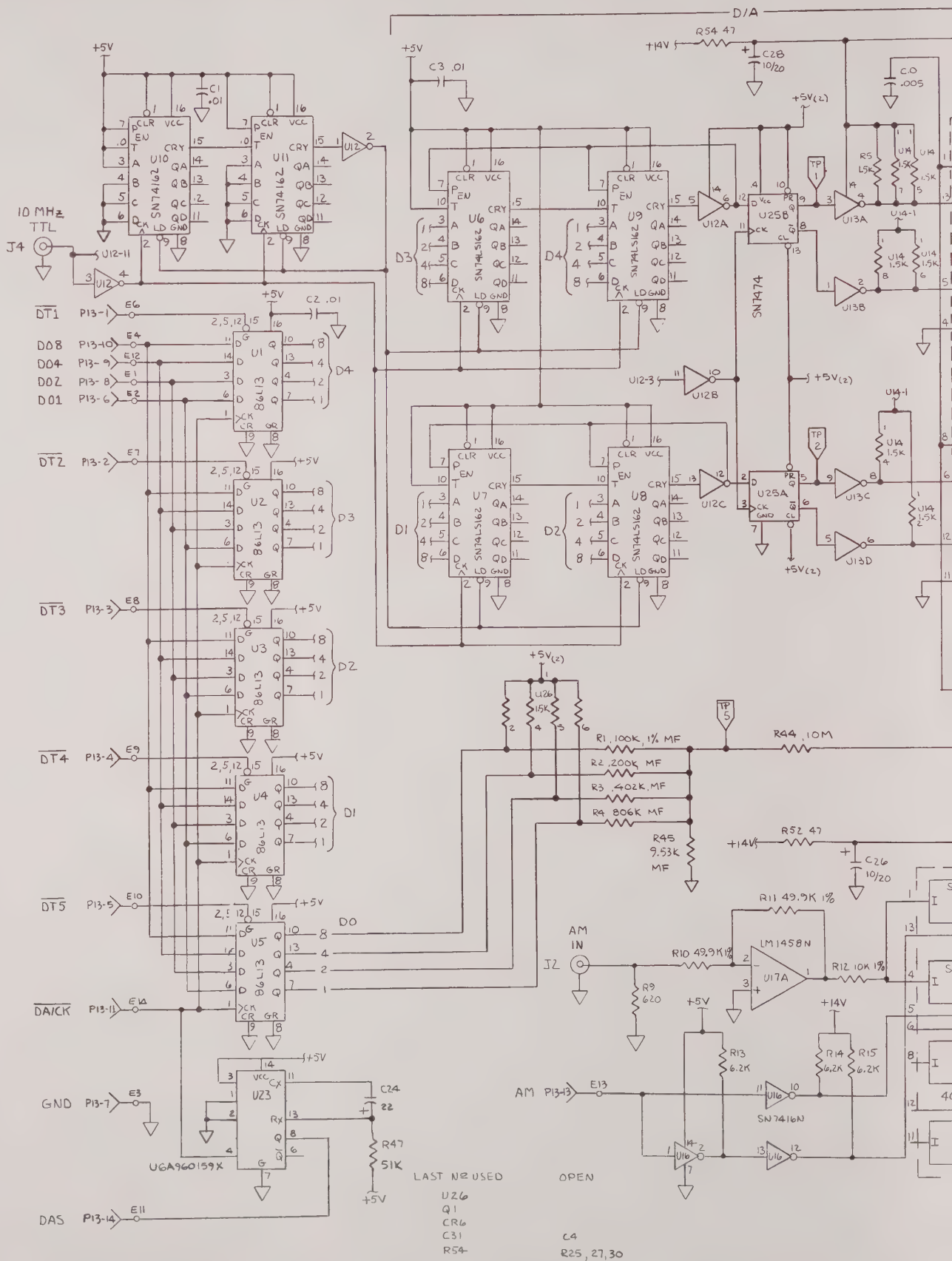
SHT OF 1

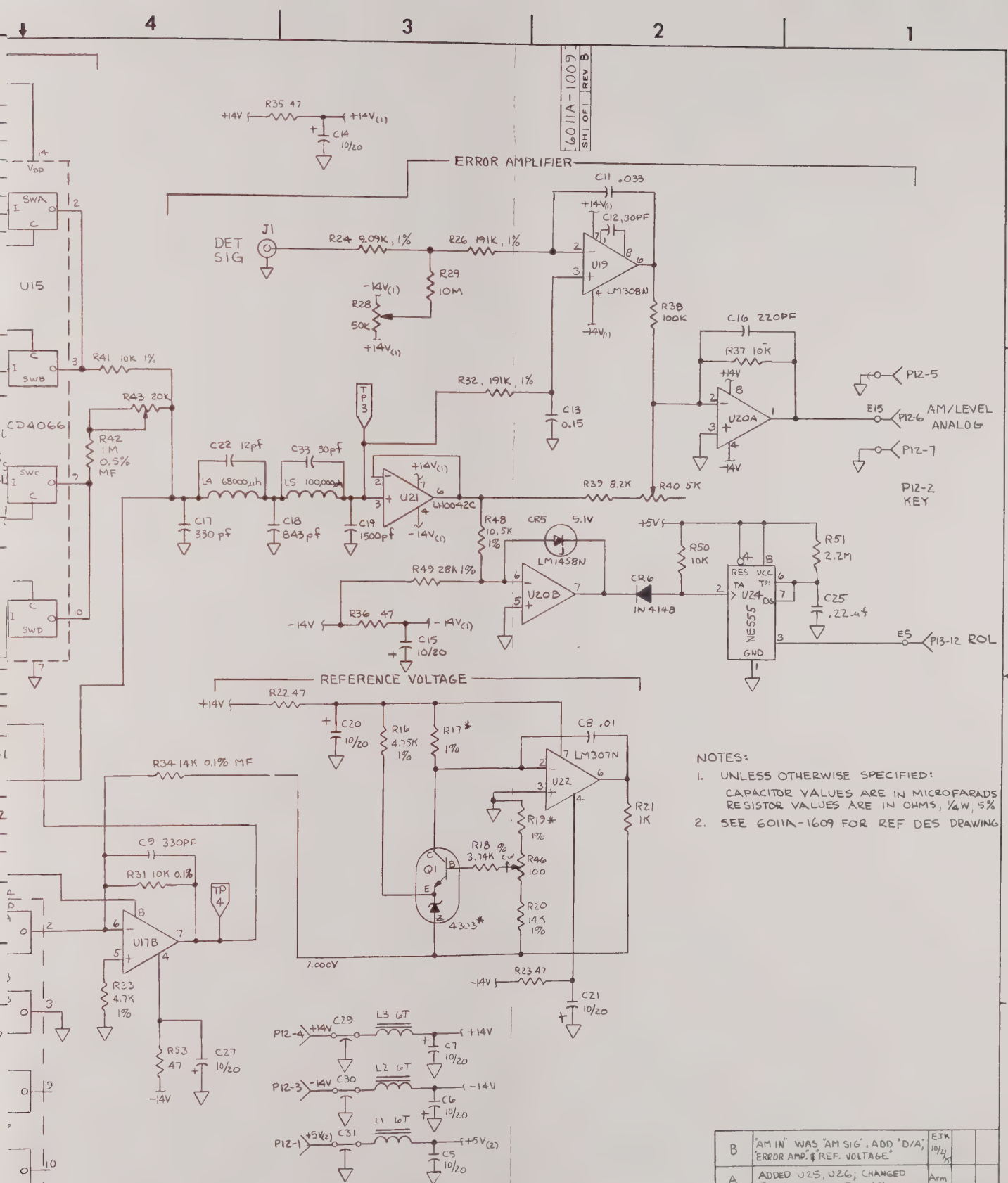
REV A



A		ADD J1-3, 5, 6, 8, 9 & 15. ADD 1		CHK	11/74
-		REL FOR PRE-PRODUCTION		CHK	11/74
REV		CHANGE DESCRIPTION		DR	CHK
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MATERIAL		LNG		FINISH	
PART NO		SIZE		DRAWING NO	
D		6010A-1008		SCALE	
SHT 1		OF 1		REV A	

A





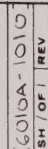
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John Fluke Mfg. Co., Inc.

FLUKE
89536
XX 1 020
XX 2 010
ANGLES 1
°C

JOHN FLUKE MFG. CO., INC.
P.O. BOX 7428 SEATTLE WA
DO NOT SCALE DRAWING
DIMENSIONS IN INCHES
TOLERANCES
000 100 DIA + .003 .007
101 200 DIA + .004 .002
201 300 DIA + .006 .003
301 400 DIA + .010 .007

DRG# 6011A-1009
CHK
ENG
MATERIAL
FINISH

B	AM IN WAS AM SIG, ADD D/A, ERROR AMP, REF. VOLTAGE	EJK	10/2/75
A	ADDED U25, U26; CHANGED PI3 CONNECTOR PIN NOS	ARM	9/2/75
REV	CHANGE DESCRIPTION	DR	CHK APPR
AMPLITUDE D/A			
PART NO	SIZE	DRAWING NO	
	D	6011A-1009	
SCALE	1	SHI	OF 1
		REV	B



NC $\rightarrow$ J3-14
NC $\rightarrow$ J3-13
NC $\rightarrow$ J3-12
NC $\rightarrow$ J3-11
NC $\rightarrow$ J3-10
NC $\rightarrow$ J3-9
ADE8 $\rightarrow$ J3-8
ADE7 $\rightarrow$ J3-7
ADE6 $\rightarrow$ J3-6
ADE5 $\rightarrow$ J3-5
ADE4 $\rightarrow$ J3-4
ADE3 $\rightarrow$ J3-3
ADE2 $\rightarrow$ J3-2
ADE1 $\rightarrow$ J3-1
NC $\rightarrow$ J3-16
NC $\rightarrow$ J3-15

→ J2-1

BSY → J2-2

REM → J2-4

→ J2-13

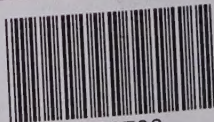
The schematic diagram shows the input section of the J2-16. It includes the following connections:

- SD1 is connected to J2-16, J2-10, J2-11, and J2-9.
- NC is connected to J2-12, J2-14, J2-5, and J2-15.
- SD0 is connected to J2-15.
- NC is connected to J2-8.
- J1-11, J1-12, and J1-16 are connected to the bottom of the J2-16 pin header.

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